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FILE

PELLETIER (R. L.) & SIMARD (J.). **Effets de certains produits chimiques sur la résistance du Chou à la jaunisse (Fusarium f. conglutinans) (Wr.) Snyder & Hansen.** [The effects of certain chemical products on the resistance of Cabbage to yellows (*Fusarium* f. *conglutinans* (Wr.) Snyder & Hansen).]—*Rep. Quebec Soc. Prot. Pl.*, **38** (*1956*), pp. 40–44, 1957. [Received Jan. 1958.]

When Marion Market cabbage plants with type A resistance to *F. oxysporum* f. *conglutinans* [*F. conglutinans*: cf. **9**, p. 694], Wisconsin Hollander, with type B resistance [cf. **13**, p. 343], and the susceptible Copenhagen Market were grown in vermiculite supplied with Gallegly and Walker's nutritive solution [cf. **29**, p. 181], with various chemicals, and subsequently inoculated with *F. conglutinans* [cf. **36**, p. 742] by pouring a spore suspension over the roots, Marion Market given *p*-nitrophenol or 2,4-D had significantly lower disease indices than untreated plants or those treated with copper 8-quinolinolate. On the other hand Wisconsin Hollander and Copenhagen Market given nitrophenol had significantly higher disease indices than the untreated or those treated with other materials. Thus nitrophenol significantly reduced the symptoms of the disease in plants with type A resistance, and significantly increased them in those with type B and in susceptible varieties. This suggests that the physiology of plants with type A resistance differs from that of the others.

HULL (R.). **Sugar Beet yellows in Great Britain, 1956.**—*Plant Path.*, **6**, 4, p. 131, 1957.

The incidence of yellows virus in sugar beet crops in 1956 [cf. **36**, p. 442] was lower than in any year in the preceding decade. In 149 fields sampled averages of 0·05, 0·7, 4·1, and 6% of the plants were infected at the end of June, July, Aug., and Sept., respectively. The percentage of the entire crop of 408,700 acres with under 1% infection at the end of Aug. was 54·8; with 1–20%, 43·2; with 21–60%, 1·8; and with over 60%, 0·2. Most of the fields heavily infected at the end of Aug. were near the coast of Suffolk and Essex; crops with moderate infection were irregularly distributed. At the end of Sept. the average percentage of infected plants was highest (11–18) in the south and in parts of East Anglia.

The average yield of sugar/acre was the 3rd highest recorded. Root yields were 12·84 tons/acre, the estimated potential yield being 13·03. The weather checked the spread of aphids; in the sample fields there were averages of only 1·7 and 6·5 *Myzus persicae* individuals/20 plants at the end of June and July; in the Holland division of Lincs. there was an average of 14·5 green aphids/20 plants at the end of June.

Of 137 sugar beet steckling beds examined in Oct., only 2 had over 1% of plants with yellows; these plants were destroyed; the average for all beds was 0·1%. For 344 mangold steckling beds the figures were 40 and 0·45%.

BERCKS (R.), BURGHARDT (H.), & STEUDEL (W.). **Serologische Untersuchungen zur Infektion von Beta-Rüben mit dem Vergilbungsvirus (Beta Virus 4) durch Myzodes persicae Sulz. und Doralis fabae Scop.** [Serological studies on the infection of *Beta* Beets with the yellows virus (*Beta* virus 4) by *Myzodes persicae* (Sulz.) and *Doralis fabae* (Scop.).]—*Phytopath. Z.*, **31**, 2, pp. 133–138, 1957.

In further studies at the Institut für Virus Serologie, Brunswick, Germany [**35**, p. 804], and the Institut für Hackfruchtbau, it was found that, in spite of the differences between the infections produced by the 2 aphids, the serological reaction and sap titre of plants infected by *D.* [*Aphis*] *fabae* corresponded quantitatively with

those infected by *M.* [*Myzus*] *persicae*, the virus content being sufficiently high to permit positive diagnosis of infection in almost 100% of the cases. But even with a lower virus content than that in the beet plants infected by *A. fabae* positive diagnosis would have been possible.

MUNDRY (K.-W.). **Über die Korrelation zwischen Partikellänge und Infektiösität beim Vergilbungsvirus der Rüben.** [On the correlation between particle length and infectivity of the yellows virus of Beets.]—*Z. Naturf.*, **13b**, 1, pp. 19–27, 1 fig., 2 graphs, 1958. [English summary. 28 refs.]

At the Institut für Landwirtschaftliche Technologie und Zuckerindustrie, Technische Hochschule, Brunswick, Germany, crude leaf sap of *Chenopodium foliosum* affected by beet yellows virus [**36**, p. 443] was partially purified by density gradient centrifugation in the cold at pH 6·2–9. After standing overnight at 2° C. the material was dialysed at pH 6·8 at room temperature. Measured by electron microscopy, the most frequent length of the filiform particles presumed to represent the infective agent of the virosis showed a gradual shift from longer to shorter with rising pH. It was concluded that (*a*) particles of 'normal' length are the infective entities of beet yellows virus; (*b*) shorter particles are non-infective; and (*c*) the infective particles are of the filiform type. There was no evidence that spherical particles are essential for the inception of infection.

MARX (RUTH). **Über die Anfälligkeit der Beta-Arten für das Rübenmosaikvirus nach mechanischer Inokulation.** [On the susceptibility of *Beta* species to Beet mosaic virus to mechanical inoculation.]—*Phytopath. Z.*, **31**, 1, pp. 79–84, 1957.

At the Zweigstelle Rosenhof des Max-Planck-Institutes für Züchtungsforschung, Ladenburg (Neckar), 8 wild *Beta* spp., growing under glass, were examined for symptoms after sap-carborundum inoculation with beet mosaic virus.

In the sect. Vulgares, *B. maritima* [*B. vulgaris* ssp. *maritima*], *B. patula*, and *B. v.* ssp. *maritima* × *B. vulgaris* developed systemic infection with characteristic symptoms as in sugar beet: pronounced primary symptoms were not observed. *B. macrocarpa* developed local lesions and, where the infection became systemic, malformation of the leaves, marked inhibition of growth, and total necrosis, but no vein-clearing or mosaic. *B. lomatogona* and *B. trigyna*, of sect. Corollinae, did not develop infection.

All species in the sect. Patellares were difficult to infect: *B. patellaris* developed local lesions but no systemic infection; *B. procumbens* developed local lesions and a delicate red flecking indicating systemic infection, but no typical mosaic; *B. webbiana* developed indistinct primary symptoms and asymptomatic systemic infection. This is the first record of *B. patula*, *B. macrocarpa*, and *B. webbiana* as hosts of beet mosaic virus.

CANOVA (A.). **Formazioni di conidi di Cercospora beticola Sacc. in coltura artificiale.** [Conidial production by *Cercospora beticola* Sacc. in artificial culture.]—*Ann. Sper. agr.*, N.S., **11**, 5, *Suppl.*, pp. xcvii–cvi, 1 pl., 1 fig., 1 graph, 1957. [English summary.]

At the Institute of Plant Pathology, University of Bologna, Italy, two methods were devised for obtaining plentiful sporulation of *C. beticola* in culture. In the 1st, disks (6–10 mm. diam.) from potato dextrose agar plates, the entire surface of which had been inoculated 3 days before with a mycelial suspension, were placed in Petri dishes with moist filter paper under the covers. In the 2nd, the superficial mycelium was removed from a 10–12-day-old culture on potato dextrose agar at 25° C. and moistened filter paper placed in the dish covers. With both methods conidia began to form after 48 hr. at 25° and continued to be produced for 10–14 days.

Cox (R. S.). **Fungicides screening trial on Onion.**—*Plant Dis. Reptr*, **41**, 9, p. 789, 1957.

In a screening test of 11 fungicides in the Florida Everglades only thylate (1½ lb./100 gal.) and parzate (2) reduced tip die-back of Texas Early Grano onions associated with a *Stemphylium* sp. and increased yields significantly.

Muntañola (María). **Parásitos criptogámicos de los Pimientos y Ajíes (Capsicum spp.) en la provincia de Tucumán.** [Cryptogamic parasites of Peppers and Chillis (*Capsicum* spp.) in the Tucumán province.]—*Rev. agron. Noroeste Argent.*, **2**, 2, pp. 295–344, 3 pl., 5 fig., 1957. [English summary.]

Erwinia carotovora and 10 fungi found on chilli (*C. annuum* and *C. frutescens*) in 1951–57 are described with notes on symptoms and taxonomy. *Phomopsis capsici* and *Ascochyta capsici* are reported for the first time in Argentina; the latter is morphologically similar to *A. hortorum*. *Curvularia senegalensis* (Speg.) Muntañola is proposed for *Brachysporium senegalense*, causing internal infection of sun-dried chillis. *Cercospora unamunoi* [**34**, p. 18] is the most prevalent leaf pathogen in the province.

Cox (R. S.). **Anthracnose, an undescribed disease of Celery in the Everglades.**—*Plant Dis. Reptr*, **41**, 9, pp. 790–793, 3 fig., 1957.

A new anthracnose disease of celery was noted in a commercial seedbed near Belle Glade, Florida, in 1956. The causal fungus was similar to *Colletotrichum truncatum*, the unicellular, falcate spores measuring 26·3 (20·1–32·5) × 3·2 (2·8–3·7) μ and the multicellular conidiophores 21·6 (11·2–35) × 2·3 (1·7–3) μ. Sterile structures resembling immature perithecia were produced in culture. Infection was restricted to the leaf blade, small, reddish-brown spots enlarging to 1–3 mm. diam. and chlorotic areas spreading from the spots over the entire blade. Inoculations were successful in the greenhouse when extended periods of free moisture and fairly high temps. prevailed; the fungus was reisolated. Tribasic copper sulphate (4 lb./100 gal.) provided the best control. Parzate and thylate in combination were highly effective though individually poor, suggesting synergism.

Winstead (N. N.), Person (L. H.), & Riggs (R. D.). **Cercospora leaf spot on Cucumbers in North Carolina.**—*Plant Dis. Reptr*, **41**, 9, p. 794, 1 fig., 1957.

Infection of cucumber (vars. Ashley, Stono, Marketer, and Model) by *C. melonis* [*Corynespora cassiicola*: **32**, p. 342] was reported for the first time in N. Carolina in 1957.

Dunleavy (J. M.). **The grasshopper as a vector of Tobacco ringspot virus in Soybean.**—*Phytopathology*, **47**, 11, pp. 681–682, 1957.

At Iowa State College, Ames, tobacco ringspot virus was transmitted from tobacco and soybean to soybean [**36**, pp. 69, 299], on which it causes bud blight disease, by the grasshopper *Melanoplus differentialis* and by a mixture of *M. mexicanus* and *M. femur-rubrum*. After 4 hr. starvation the insects were fed for about 1 min. on diseased plants and then transferred to 30–40-day-old healthy ones, where the length of time of feeding had a marked effect on the percentage of infection. If left on the leaf the insect eats the portion it has previously infected; the highest infection was thus obtained with only 1 bite, and none resulted from feeding for more than ½ min. In view of these feeding habits the grasshopper is not considered likely to be an important vector of this virus.

Kaufmann (M. J.) & Chamberlain (D. W.). **The effect of antibiotics on Pseudomonas glycinea.**—*Plant Dis. Reptr*, **41**, 9, pp. 806–807, 1957.

In laboratory assays at Urbana, Illinois, by the paper-disk plate method the hydrochlorides of aureomycin and achromycin and tetracycline, all at 10 p.p.m.,

inhibited the multiplication of *P. glycinea* isolated from soybean [**36**, p. 633]. In field tests on Adams soybeans sprayed weekly with 7 antibiotics and inoculated 24 hr. after each treatment only streptomycin sulphate at 250 p.p.m. gave satisfactory control, though it ranked below the other 3 antibiotics in the laboratory. The plants recover from streptomycin-induced chlorosis with apparently no permanent damage.

TANDON (R. N.) & AGARWAL (G. P.). **Dry rot of Colocasia antiquorum and Potato caused by Fusarium coeruleum (Lib.) Sacc.**—*Allahabad Univ. Stud., Bot., 1956*, 26 pp., 4 pl., 1956. [Received Nov. 1957.]

Dry rot of *C.* [*esculenta* var.] *antiquorum* (*F. caeruleum*) [**35**, p. 479] appears to be a newly recorded disease in India. In Uttar Pradesh losses of corms ranged from 15–25% and there was on occasion 35% infection. The symptoms on this host and potato were similar but the *Colocasia* strain appeared more vigorous on *Colocasia* corms than the potato strain. Soil associated with either crop and containing rotted remains could easily serve as a source of infection for the other. The fungus remained viable in sterilized compost under different storage conditions for more than 2 yr. Infection was noticed in wounded corms stored in contaminated wooden boxes and sacks.

Seed corms could be satisfactorily protected by treatment with 0·1% $HgCl_2$ or 5% formalin, but mixing any of the common fungicides with the soil was ineffective in the field.

KLESSER (P. J.) & LE ROUX (P. M.). **Groundnut rosette prevention the best method of control.**—*Fmg in S. Afr.*, **33**, 8, pp. 40–41, 1 fig., 1957.

From the Agricultural Research Institute, Pretoria, it is reported that in the 1956–7 epidemic of groundnut rosette virus [**35**, p. 587] the most severe losses occurred, as usual, in the Waterberg district. The method of control requires the removal and destruction of all volunteer plants, whether diseased or sound, and also of diseased plants from early in the season to 2 months after planting. Measures to ensure a dense, unbroken stand are described and a 3–4 year crop rotation is advocated. Sowing should be carried out before the middle of Nov. so that the plants will be sufficiently advanced before a severe aphid infestation can set in.

OCHS (G[ERTRUD]). **Stoffwechselphysiologische Untersuchungen an reisigkranken Reben.** [Studies on the physiology of metabolism in court-noué-diseased Vines.]—*Phytopath. Z.*, **30**, 3, pp. 339–341, 1957.

Comparative analyses by paper chromatography of the expressed sap of healthy vine leaves and those with court-noué [vine infectious degeneration virus] from 1954 to 1956 at the Institut für Weinbau, Bernkastel-Kues, Germany, revealed a particularly heavy accumulation of tannins and a reduced amino acid content in the latter. Infected material was richer in reducing sugars and saccharose, while laevulose was usually absent. Carbonic acids were also much more abundant in diseased sap, which also contained quantities of natural gums and hydrolysing enzymes. Similar but less marked differences occurred in juice of healthy and infected grapes.

Paper-chromatographic methods are considered to be too costly for use in the rapid diagnosis of infectious degeneration. The Lindner colorimetric test [**31**, p. 420 *et passim*] was also adjudged to be inapplicable to this virosis since the author, unlike Pieri [**35**, p. 865], could detect no assured differences in colour between diseased and healthy wood and leaf material.

GOHEEN (A. C.), HARMON (P. N.), & WEINBERGER (J. H.). **Leaf roll (White Emperor disease) of Grapes in California.**—*Phytopathology*, **48**, 1, pp. 51–54, 1 fig., 1958.

Observations at the University of California, Davis, and the Horticultural Field

Station, Fresno, have shown that the symptoms of White Emperor disease of grapes [**36**, p. 303] are the same as those of vine leaf roll virus [**18**, p. 652, **34**, p. 343], and the latter name should be used. The history of the disease in California is reviewed and the symptoms are described. Leaves roll downwards and develop marginal and interveinal chlorotic areas by midsummer. These turn red on leaves of varieties with red or black fruit and become necrotic on many varieties. Foliage symptoms start on the oldest leaves and resemble those described for 'brunissure', 'rougeau', 'flavescence' [**37**, p. 260], and K deficiency [**34**, p. 130]. The disease is mainly spread by use of infected propagating material.

BARRETT (H. C.). **Vitis cinerea as a source of desirable characters in Grape breeding.** —*Proc. Amer. Soc. hort. Sci.*, **70**, pp. 165–168, 1957.

In breeding work at the University of Illinois, Urbana, the native sweet winter vine, *V. cinerea*, proved highly resistant to black rot [*Guignardia bidwellii*: **35**, p. 744] and very resistant to downy mildew [*Plasmopara viticola*], a few scattered leaves developing an occasional infection by downy mildew only under exceptional climatic conditions. The F_1 from crosses with susceptible commercial varieties were intermediate in resistance to black rot, infection ranging from medium to only a trace on the berries, though similar seedlings from crosses between commercial varieties in adjacent vineyard rows suffered an almost complete loss of fruit. Downy mildew was not seen on the F_1. Powdery mildew [*Uncinula necator*: cf. **34**, p. 428], anthracnose [*Elsinoe ampelina*: cf. **21**, pp. 318, 319; **35**, p. 130, *et passim*], and *Botrytis* or ripe rot [*B. cinerea*: cf. **31**, p. 167, *et passim*] presented no problem on either the parental varieties or the F_1 hybrids.

EMILIANI (G.). **Sperimentazione antiperonosporica con prodotti acuprici dell' anno 1956.** [Experiments against downy mildew with non-copper products in the year 1956.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **14** (*1956*), 2, pp. 189–211, 1957. [English summary.]

In further spraying tests [**36**, p. 84] against vine downy mildew [*Plasmopara viticola*: **37**, pp. 17, 68], made to determine the degree of control given and the effect on growth, Cesanese vines near Rome were sprayed 10 times, from 12 May to 19 July 1956, with aspor (Società Montecatine) [loc. cit.], tioditam (S.A.R.I.A.F. Faenza; zineb base combined with S), orthocide 50 (California Spray Chemical Corporation), dithex ramato (Soc. Bombrini, Parodi, Delfino; zineb base and 1·87% Cu), and Bordeaux mixture (control).

On 20 July the percentages of infected leaves were, respectively, 18·92, 14·16, 15·24, 21·63, and 16·9, the corresponding figures (leaves on fruiting shoots only) on 28 July being 32·46, 22·54, 27·76, 36·9, and 31·05. Tioditam appeared to give good control, but the lesions were rather large. The use of non-copper products is indicated during the early part of the growing period, Cu-containing materials being employed later, because of their more stable fungicidal effect. The organic fungicides gave no control of *Oidium* [*Uncinula necator*]. On the vines treated with Bordeaux mixture and dithex ramato, defoliation appeared to proceed regularly, but this was not so with the non-copper products, sudden, unexpected increases in leaf-shedding taking place, possibly related to sudden losses of the chemical from the leaf surfaces induced by weather conditions.

ALIMOVA (Mme V. A.). Можно ли рекомендовать динитрородонбензол против мильдью Винограда. [Can dinitrorhodanebenzole be recommended for control of Vine mildew?]—Винод. и Виноград. С.С.С.Р. [*Vitic. & Wine-Mak., Moscow.*], **163**, 4, pp. 38–39, 1956. [15 refs. Received 1958.]

In tests in U.S.S.R. dinitrorhodanebenzene [nirit] was far less effective than Bordeaux mixture or fuclasin against vine [downy] mildew [*Plasmopara viticola*: **36**, p. 635].

It is clear that the compound combined with copper oxychloride has a very good effect but does not adhere well.

Raykov (E. V.). Причини за пораженията от маната по Гроздето през 1955 г. [Reasons for losses from mildew on Vines in 1955.]—Бюл. рас. Защ. (*Bull. Plant Prot., Sofia*), **4** (*1955*), 6–7, pp. 78–83, 2 fig., 1956.

In the coastal districts, especially the Burgas area, in Bulgaria, vine mildew [*Plasmopara viticola*: **37**, p. 438] was very widespread and in many cases caused up to 50% loss. This was attributable to poor spraying of bush-type vineyards, where Bordeaux mixture should be applied before 11 Aug. and coverage of both leaf surfaces and the fruit achieved.

Madaluni (Anna L.). **Nota preliminare su alcune osservazioni relative al ciclo biologico dell' Oidio della Vite.** [A preliminary note on some observations relative to the life-cycle of *Oidium* of the Vine.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **14** (*1956*), 2, pp. 323–331, 3 fig., 1957. [English summary. 27 refs.]

After notes on the relevant literature, the author describes preliminary studies on the life-cycle of *Uncinula necator* in Rome and other parts of Latium, Italy, where abundant perithecia were found. The work is still in progress.

Pine (T. S.). **The use of captan in the control of the dead-arm disease of Grapes.**—*Plant Dis. Reptr*, **41**, 10, pp. 822–824, 1957.

In trials in 1955 and 1956 in San Joaquin county, California, of various materials for the control of *Phomopsis* [*Cryptosporella*] *viticola* [**26**, p. 528; **37**, p. 131] on Tokay vines, applied when the new growth was only 6 in. or less in length, captan 50-W at 2 lb./100 gal. water proved the most efficient. Protection of the new growth ensured a larger crop during the current season and reduced the source of inoculum for the following season on the growth at the base of the new canes. Max. control was obtained when dormant sprays of sodium arsenite and foliar sprays of captan 50-W at 1–2 in. growth were combined.

Makarov (S. N.). О пятнистом некрозе и 'сухорукавности' Винорада. [On speckle necrosis and 'branch wilting' of Vine.]—Изв. Молдав. Фил. АНСССР. [*Izv. Moldav. Fil. Acad. Sci. U.S.S.R.*], *1956*, 1, pp. 91–113, 1956. [24 refs. Moldavian summary. Abs. from *Referat. Zh. Biol.*, *1957*, 16, p. 192, 1957.]

A bark necrosis disease of vines in Moldavia, apparently influenced by the weather, has been successfully checked by spraying with 10% and 20% $FeSO_4$ solution. The disease appears to result from a complex of causes and predisposes the vines to attack by fungal diseases.

Hagler (T. B.). **Effect of magnesium sprays on Muscadine Grapes.**—*Proc. Amer. Soc. hort. Sci.*, **70**, pp. 178–182, 1 fig., 1957.

In greenhouse sand culture studies at Alabama Polytechnic Institute, Auburn, the total dry wt of Hunt muscadine vines given foliar sprays in 1954 and 1955 of 8 different Mg salts [cf. **32**, p. 320], to correct leaf chlorosis, was significantly less than that of the full nutrient plants except those given $MgCl_2$ at 91·4 g./gal. All except the full nutrient showed some degree of Mg deficiency, sometimes extreme. The Mg content of leaves sprayed with $MgCl_2$ was 0·3%, as against 0·37 on a dry weight basis for leaves given the full nutrient solution.

Uota (M.). **Evaluation of polyethylene film liners for packaging Emperor Grapes for storage.**—*Proc. Amer. Soc. hort. Sci.*, **70**, pp. 197–203, 1957.

In 1953 and 1954 Emperor grapes were stored at the U.S. Dept Agric., Fresno, California, following fumigation with 1% SO_2 for 20 min., in packages lined with sealed polyethylene film, in which the atmosphere was modified by the inclusion

of some chemical in a perforated bag [cf. **35**, p. 106]. Storage was at 32° F. in a room fumigated with SO_2 at 14-day intervals.

Modified atmospheres alone did not maintain the quality of the grapes or control [unspecified] decay. Inclusion of sodium bisulphite (4 g.) in some liners gave satisfactory control (2·7% decay), but injured the fruit. Activated charcoal impregnated with 15 g. 20% SO_2 reduced decay from 41·4% (no fungicide) to 2%, but gas was desorbed too rapidly and the fruit injured early in the storage period. With 2 g. of sodium bisulphite decay was 8·2% but the gas release was too rapid and injury resulted. With 10 g. of sodium bisulphite and silica gel mixture (1:1) the SO_2 was released throughout the storage period with the result that the appearance of the fruit remained excellent even after 145 days. Gas concentration within the package was, however, slightly too low and decay was 8·8%. With perforated liners and no included chemical decay ranged from 1·3 to 4·4%.

Merny (G.). **Maladies des plantes cultivées à la Station de Recherches de la CGOT à Séfa en Casamance (Septembre–Octobre 1956).** [Diseases of the plants grown at the Research Station of the CGOT at Séfa in Casamance (September–October, 1956).]—*Agron. trop., Nogent*, **12**, 6, pp. 725–734, 1957. [English and Spanish summaries.]

In a varietal resistance test with dry rice the best var., Bluebonnet 50, was relatively resistant to *Helminthosporium oryzae* [*Cochliobolus miyabeanus*: **34**, p. 632], as were E 425, 559 A, and R 67. The most susceptible, 560 A, did not differ significantly from 415 and R 52. Var. 902, significantly different from the best and the worst, displayed mediocre resistance. Other experimental evidence demonstrated that any of the fertilizers used favoured the disease, which appeared to develop only on vigorous plants. This effect seemed to be diminished when the N/K ratio was very small. The leaves of plants growing in unfertilized soil were less affected by the disease, but their surface area was much smaller.

At Séfa, 20 days after 'full earing' (i.e. when 50% of the panicles had formed), the vars. Blue Rose 41, 1,098 T.R., Commores, and E 417 had, respectively, 42·2, 15·6, 8, and 30·7% of the panicles infected by *Piricularia oryzae* [cf. **33**, p. 758].

Isolations from seed harvested in 1955 gave *Nigrospora oryzae* and *C. miyabeanus* from green seed discoloured brown, *N. oryzae* from green seed early in the attack, *Curvularia lunata*, *C.* sp., and *Mucor* sp. from brown paddy, *P. oryzae* from husked seed with brown spots, and *Helminthosporium* sp. from husked seed with white spots. *Cochliobolus miyabeanus* and *P. oryzae* overwinter on the grain.

A survey of the seed of 23 varieties showed that susceptibility of the glumes was not closely related to that of the seed. Some seeds, the glumes of which readily become infected, have a resistant endosperm, while others, where infection does not spread over the surface of the glumes, may have a susceptible endosperm, into which infection penetrates deeply. Judging from the counts of discoloured grain in 1954 and 1955, Bluebonnet 50, R 52, Zenith, Magnolia, and 46–C–711 appeared to be the less susceptible varieties.

Locally, *Vigna sesquipedalis* is affected by leaf spot (*Cercospora canescens*), *Mucuna utilis* by leaf spot (*C. mucunae*), and old leaves of *Pennisetum typhoideum* bear spores of *N. oryzae*.

Schaffnit (E.). **Erlebtes, Erstrebtes und Erreichtes.** [Experiences, aspirations, and achievements.]—279 pp., 3 pl., Bonn, Ludwig Röhrscheid Verlag, 1957. DM. 14.50.

This autobiography describes, *inter alia*, the development and activities of the Institut für Pflanzenkrankheiten, Bonn, under the author's direction.

Volkov (S. M.), Zimin (L. S.), Rudenko (D. K.), & Tupenevich (S. M.). Альбом вредителей и болезней сельскохозяйственных культур нечерноземной

полосы Европейской части С.С.С.Р. [Album of the pests and diseases of agricultural plants in the non-black soil strip of the European U.S.S.R.]—488 pp., 209 col. pl., Agricultural Literature, Moscow–Leningrad, 1955. Roubles 60. [Received 1958.]

In the plant disease section (pp. 310–458) of this book 73 common fungal diseases are described in detail, with their host ranges and control measures; each one is illustrated by a coloured plate.

Smith (W. K.). **A survey of the production of pectic enzymes by plant pathogenic and other bacteria.**—*J. gen. Microbiol.*, **18**, 1, pp. 33–41, 1958.

At the Akers Research Laboratories, Welwyn, Herts., 67 cultures of plant pathogenic bacteria, of the genera *Agrobacterium*, *Corynebacterium*, *Erwinia*, *Pseudomonas*, and *Xanthomonas*, and 56 of non-pathogenic bacteria were tested for the production of pectic enzymes in culture [cf. **37**, p. 72]; γ-pectin glycosidase was produced by 22 isolates of pathogenic and 15 of non-pathogenic bacteria. Pectin methyl esterase was produced by *Erwinia* spp. producing soft rots, *X. campestris*, and 1 of 3 cultures of *X. vasculorum*. The distribution of pectin methyl esterase was a characteristic feature of the results. It was more restricted in its distribution than pectin glycosidase, and was never found in the absence of the glycosidase. Formation of pectin methyl esterase was much more sensitive to variations in the cultural conditions than was that of pectin glycosidase.

It is concluded that while a number of saprophytic bacteria as well as some plant pathogenic species produce enzymes which degrade pectic substances, the production of pectin methyl esterase is limited to a few pathogens: in the soft-rot *Erwinia* spp. and *X. campestris* it might well be a diagnostic feature; in *X. vasculorum* this faculty is less constant.

Smith (W. K.). **Chromatographic examination of the products of digestion of pectic materials by culture solutions of plant pathogenic and other bacteria.**—*J. gen. Microbiol.*, **18**, 1, pp. 42–47, 1958.

At the Akers Research Laboratories, Welwyn, Herts., solutions containing pectic materials were digested by solutions from cultures of 25 bacteria and examined chromatographically for katabolic products. Galacturonic acid and oligouronides were produced by soft-rot *Erwinia* spp., *Xanthomonas campestris*, *Pseudomonas marginalis*, and *Bacillus polymyxa*; *Klebsiella aerogenes* formed galacturonic acid only. The distribution of this faculty among the species is similar to that of the ability to produce pectin methyl esterase [see above], though some exceptions are noted.

Jordana (R. V.) & Beltrá (R.). **Medio selectivo para orientar la identificación de algunas bacterias fitopatogenas y en especial del Pseudomonas savastanoi.** [Selective medium as a guide to the identification of some phytopathogenic bacteria, especially *Pseudomonas savastanoi*.]—*An. Edafol. Fisiol. veg.*, **15**, pp. 493–496, 1 graph, 1956. [Received 1958.]

A selective medium used in the microbiological section of the Instituto de Edafologlía y Fisiología Vegetal, Madrid, for the preliminary diagnosis of *P. savastanoi* from olive and other *P.* spp. [cf. **35**, p. 198] in the early stages of isolation is described. The rapid increase in alkalinity developed by these bacteria is detected by the colour change in a broth medium initially at pH 7, containing 1–2% lactose and 0·3–0·4 g./1,000 of *o*-cresolphthalein in 2% N NaOH.

Rier (J. P.) & Henderson (J. H. M.). **The relationship of temperature and nutrition to the growth of Sunflower tumor tissue in vitro.**—*Plant Physiol.*, **32**, 5, pp. 494–497, 4 graphs, 1957.

The growth of sunflower tumour tissue [*Agrobacterium tumefaciens*] and habituated

tissue [cf. **36**, p. 577] was observed at the Carver Foundation, Tuskegee Institute, Alabama, on media consisting of (1) salts and sugar and (2) the same supplemented by casein hydrolysate, adenine sulphate, and a mixture of vitamins; both were used with or without indole-acetic acid at 0·05 mg./l.

Tumour-tissue development was more retarded at 33–34° C. on unenriched media than on those containing supplements. The autonomous nature of tumour tissue was altered at this abnormally high level for growth, which was reached accidentally and persisted for 5 weeks, with a resultant significant decrease in weight. The supplements to the medium offer a partial replacement for a naturally occurring 'tumour progression principle' (TPP) which is regarded as wholly or partly responsible for the autonomous character. Indole-acetic acid proved to be essential to the recovery of tumour tissue growth.

Habituated tissues were not affected by the temperature change when cultured on medium (2) +indole-acetic acid.

Weber (F.). **Trichome an crown-galls von Nicotiana.** [Trichomes on crown galls of *Nicotiana*.]—*Protoplasma*, **48**, 1, pp. 143–146, 3 fig., 1957.

An unusually dense pubescence was observed on some crown gall (*Pseudomonas* [*Agrobacterium*] *tumefaciens*) tumours on tobacco stems [at the Pflanzenphysiologisches Institut, Graz, Austria]. The glandular hairs of such 'felt galls' attained a length of 1·8–3 or even up to 3·8 mm. as compared with the normal 0·7–1, while the transverse diameter of the enlarged basal cells was also about double the normal. The nuclei and nucleoli of the giant hairs were of exceptional size. The pocket of cytoplasm containing the 'hypertrophied' nuclei was characterized by radiating strands and a honeycomb-like structure, such as is associated with virus-infected tobacco hairs [**35**, p. 850].

Chararas (C.). **Étude sur une maladie cryptogamique de Leperesinus fraxini Panz. et de Dryocoetes autographus Ratz. (Col. Scolytidae).** [A study on a cryptogamic disease of *Leperesinus fraxini* Panz. and *Dryocoetes autographus* Ratz. (Col. Scolytidae).]—*Rev. Path. vég.*, **36**, 3, pp. 145–155. 3 fig., 1957. [German summary.]

In Haute-Savoie, France, *Paecilomyces varioti* killed many individuals of *L. fraxini* infesting an ash tree. In inoculation experiments in the laboratory, infection of *L. fraxini* and *D. autographus* occurred at 5–37° C. and above 20% R.H. Pathogenicity depended, however, on close contact between fungus and insect, the fungus apparently penetrating only with difficulty between the bark and the wood of spruce branches to infect *D. autographus* there. In nature mortality among 4th stage larvae and adults of *L. fraxini* does not exceed 10%. In the 1st stage of attack the dying insect shows no outward sign of infection, while in the 2nd, a few days later, the dead insect becomes covered with mycelium. Infection appears to originate in the integument.

Speroni (G.). **I fitofarmaci. Parte II — I fungicidi e gli erbicidi.** [Plant drugs. Part II—fungicides and herbicides.]—*Chim. e Industr.*, **39**, 3, pp. 184–205, 8 fig., 1 diag., 1957.

This useful survey of up-to-date information on different types of fungicides, i.e. seed dressings and disinfectants for external and internal treatment, and on the application of antibiotics in plant pathology is supplemented by a table giving the formulae, principal agricultural uses, and toxicity (LD 50) to mammals of a large number of commercial products, together with some explanatory comments.

Cristinzio (M.). **Prove sulla efficacia anticrittogamica di alcuni prodotti acuprici in confronto con la poltiglia bordolese.** [Tests of the fungicidal efficacy of some

non-copper products in comparison with Bordeaux mixture.]—*Ric. fitop. Campan.*, **13–14**, pp. 49–52, 1957.

The author briefly reviews further spraying tests conducted in S. Italy in 1956 with non-Cu products (compared with Bordeaux mixture) for the control of vine mildew (*Plasmopara viticola*) [cf. **37**, p. 68 *et passim*], brown rot of apricot (*Sclerotinia laxa*), mal secco of citrus (*Deuterophoma tracheiphila*) [cf. **36**, p. 108], *Phytophthora infestans*, *Alternaria solani*, and *Stemphylium solani* [cf. **34**, p. 618] on potato and tomato, and *Septoria lycopersici* [cf. **33**, p. 437] on tomato. In general, aspor, captan, ditex, ditam, zineb, and nirit gave promising results.

Zanardi (D.). **Efficacia antifungina comparativa di anticrittogamici organici con o senza autoclavazione.** [The comparative anti-fungal efficiency of organic fungicides with and without autoclaving.]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 27–32, 1957. [English summary.]

Autoclaving nutrient mineral solutions containing glucose and peptone +*o*-oxyquinoline, captan, or zineb at 1, 10, 100, and 1,000 p.p.m., at 1·5 atm. for 30 min. reduced the fungicidal efficiency of the 3 materials in tests against *Fusarium solani*, *Phoma destructiva*, and *Phytophthora* sp. (the 1st two from capsicum, the 3rd from tomato) to about 0·1 of the original.

Picco (D.). **Prove preliminari di attività anticrittogamica del trifenilacetato di stagno.** [Preliminary tests of the fungicidal activity of triphenylacetate of tin.]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 33–41, 1 pl., 1957. [English summary.]

In spraying tests in Italy, tin triphenylacetate (20% active material, manufactured by the Società Emelfa) was severely injurious to tomato plants, much less so to celery, and was non toxic to sugar beet. Its fungicidal effects on tomato plants were not tested, but against *Septoria apii-graveolentis* on celery it was more effective than 1:1:100 Bordeaux mixture, and against *Cercospora beticola* on sugar beet it was at least as effective as copper oxychloride, alone or with calcium oxychloride, at the usual dosage.

Krexner (R.) & Wenzl (H.). **Verbesserte Erfolgsaussichten der Bekämpfung von Krankheiten in Hackfruchtbau.** [Improved outlook in the control of diseases of truck crops.]—*Pflanzenarzt*, **11**, 2, pp. 25–26, 1958.

In trials reported from the Bundesanstalt für Pflanzenschutz, Vienna, the organic tin compound brestan (VP 1940) at 1·8 kg./ha. was superior to maneb, copper oxide, and various copper oxychloride preparations in the control of *Phytophthora infestans* on potato, and superior to copper oxychloride against *Cercospora* [*beticola*] on beet [cf. above].

Hetnarski (B.), Eckstein (Z.), & Urbański (T.). **Chemiczne środki działające grzybobójczo. I. O pewnych pochodnych S-alkilo-, alkoksyalkilo- i arylortęciowych 2-merkaptobenzotiazolu. II. O pewnych pochodnych N-alkilo-, i -fenylortęciowych benzoksazolonu i 6-chlorowcobenzoksazolonu.** [Chemical methods of effecting the control of fungi. I. On certain S-alkyl-, alkoxyalkyl-, and aryl mercury derivatives of 2-mercaptobenzothiazole. II. On certain derivatives of N-alkyl- and phenyl mercury benzoxyazolone and 6-chlorogenobenzoxyazolone.]—*Przem. Chem.*, **36**, 5, pp. 291–293, 1957; **37**, 1, pp. 44–46, 1958. [Russian and English summaries.]

In *in vitro* experiments at the Warsaw Polytechnic a powerful antagonistic action towards *Fusarium culmorum*, *Alternaria tenuis*, and *Rhizoctonia* [*Corticium*] *solani* was exerted by several S-alkyl-, alkoxyalkyl, and arylmercury derivatives of 2-mercaptobenzothiazole prepared by the reactions of its Na salt with the correspond-

ing halides. The activity of the compounds was found to be closely dependent on the hydrocarbon group bound with the Hg atom.

In further tests some new derivatives of N-alkyl- and phenylmercury benzoxyazolone-2 and 6-chlorogenobenzoxyazolone-2, prepared by the reaction of their Na or Ag salts with the corresponding alkylmercury halides or phenylmercury acetate, proved to be highly fungicidal.

Marcelli (E.). **Risultati di alcuni trattamenti contro le muffe delle garze adibite alla costruzione di capanne per Tabacchi da fascia.** [The results of treatments against moulds on cheese cloths used for the construction of covers for Tobacco under cover.]—*Tabacco, Roma*, **61**, 684, pp. 255–261, 1957. [English summary.]

After a preliminary laboratory test of the effect of various fungicides against fungi of 9 genera, which are listed, causing moulds on cheese-cloths used as covers for tobacco beds in Italy, commercial solution of phenyl mercury oleate (10% active material) was diluted to 2/1,000 and used as a steep. In the 1st experiment 6 cloths each 3×80 m. were kept in 3,000 l. of solution until the yarn had absorbed all the fluid possible, 2 further lots of 6 similar cloths being treated in turn immediately after. In the 2nd 5 cloths were steeped for 1 and 2 hr. and 6 cloths for $2\frac{1}{2}$ hr. The cloths were dried and then used to cover tobacco beds in various localities in Italy. At the end of the growing period no mould (in one instance a very little) was present on the treated cloths, though untreated covers were severely attacked. In practice it would be advisable to increase the period of treatment for the 3rd lot of cloths in the 1st experiment or to fortify the solution.

Croxall (H. E.). **A general survey of the foliage diseases of arable crops.**—*J. Sci. Fd Agric.*, **7**, Suppl., pp. s13–s15, 1956. [Received Dec. 1957.]

This paper, read to the Pesticides Group, National Crop Protection Conference, Eastbourne, Nov. 1955, concludes by stressing the need for more widespread observations and records of crop losses in order to assess the diseases deserving primary attention by research workers in formulating control measures that are economically worthwhile.

Taber (W. A.) & Vining (L. C.). **Amidomycin, a new antibiotic from a Streptomyces species. Production, isolation, assay, and biological properties.**—*Canad. J. Microbiol.*, **3**, 7, pp. 953–965, 1957.

At the Prairie Regional Laboratory, Saskatoon, Saskatchewan, an antifungal antibiotic 'amidomycin' was obtained from *Streptomyces* sp. PRL 1642 by solvent extraction of the filtrate obtained after adjusting the pH of a soybean meal broth culture to 3·5. Suspended in agar media this substance noticeably inhibited the growth of *Ustilago maydis*, *U. trebouxii*, and other fungi at 0·6–7 μg/ml.

Verona (O.). **The antimycotic action of amphoterycin A and B on plant pathogenic fungi.**—Reprinted from *Ann. Microbiol. Enzimol.*, **7**, 5–6, 7 pp., 1 fig., 2 graphs, 1957. [Italian summary.]

Picci (G.). **Azione delle amfotericine A e B sui lieviti della fermentazione vinaria.** [The action of amphotericin A and B upon yeasts used in the fermentation of wine.]—*Ibid.*, **7**, 5–6, 7 pp., 7 graphs, 1957. [English summary.]

In the 1st paper experiments are described which showed the antibiotics amphotericin A and B (Squibb Laboratories, New York) to have a strong antifungal effect on 30 phytopathogenic fungi.

In the 2nd paper the compounds are shown to be effective also against 10 yeasts used in wine fermentation.

Hausam (W.). **Zur Frage der Prüfung von Textilien auf Widerstandsfähigkeit gegen Schimmelpilze. Bemerkungen zu den DIN-Vorschlägen 53930 und 53931.** [On the problem of the testing of textiles for resistance to mould fungi. Observations on the DIN-specifications 53930 and 53931.]—*Z. ges. Textilind.*, **59**, 17, pp. 712–715, 1957.

A detailed, tabulated survey is given of experiments at the Chemische Fabrik Dr. F. Raschig GmbH, Ludwigshafen (Rhein) to appraise these specifications. Among the revisions proposed are the replacement of the oatmeal-malt extract medium by a synthetic medium containing glucose, saccharose, or dextrose as a C source in assays with *Aspergillus niger* as the test fungus. Filter paper may prove useful as a C source for *Chaetomium globosum* in tests on heavy fabrics impregnated with a practically water-insoluble combination of Raluben-Raschig (a higher halogenated phenol) and pentachlorophenol (1:1) as a preservative.

Böing (J.). **Schimmelbefall einer Paraffinemulsion.** [Mould infection of a paraffin emulsion.]—*Zbl. Bakt.*, Abt. 2, **111**, 1–5, pp. 123–124, 1958.

An aqueous paraffin emulsion was transformed into a grey mass by the invasion of *Penicillium* ? *brunneo-rubrum* and *Aspergillus* sp. The moulds were shown by experiment to utilize the oil as a C source, the coefficients of assimilation (amount of dry mycelium produced on 10 g.) being 63% for *Penicillium* and 52% for *Aspergillus*.

Anand (J. C.) & Johar (D. S.). **Effect of condiments on the control of Aspergillus niger in Mango pickle.**—*J. Sci. industr. Res.*, **16A**, 8, pp. 370–373, 1957.

Among a number of spices tested at the Central Food Technological Research Institute, Mysore, India, for their inhibitory action on *A. niger* in mango pickle, cinnamon and cloves were the most effective, suppressing growth at levels of 0·3 and 0·2 g./100 g. pulp, respectively, where NaCl was also added at the rate of 15 g./100; without salt the concentrations requisite to produce a comparable effect were 3 and 0·6%, respectively.

Boullard (B.). **Étude des mycorrhizes dans le genre Cedrus. Première contribution.** [A study of the mycorrhiza in the genus *Cedrus*. First contribution.]—*Bull. Soc. mycol. Fr.*, **73**, 3, pp. 225–244, 5 fig., 2 diag., 1957.

Experiments in which young cedars were grown in the laboratory, either in the presence of *Sepultaria sumneriana* (which co-exists with cedars) or in samples of soil and roots from diverse sources, showed that various species of cedar are able to form ectotrophic mycorrhiza. Mycorrhiza are uncommon on 1-year-old trees, but develop markedly during the 2nd and 3rd years; they become scarce again as the trees age, and in very old trees are generally lacking. There is considerable morphological variety. The fungi found, of unnamed genera, occurred on 4 spp. and 1 var. of cedar. Evidence was found of a gradient of resistance to mycorrhizal infection.

Nicolson (T. H.). **Vesicular-arbuscular mycorrhiza in the Gramineae.**—*Nature, Lond.*, **181**, 4610, pp. 718–719,1 fig., 1958.

Grasses from embryo sand dunes at Gibraltar Point, Lincs., showed about 20% root infection by vesicular-arbuscular mycorrhiza. The spore aggregates on roots of *Festuca rubra* var. *arenaria* and *Ammophila arenaria* varied widely in size, but were always under 0·8 mm. diam. Three main types of structure occurred: the spores or vesicles were embedded in a matrix of hyphae and organic matter or of organic matter with few, if any, hyphae, or compact masses of spores were present, not embedded to any extent. Most of the endophytes present in grasses appear to be related to *Endogone* [cf. **17**, p. 263; **35**, p. 903].

Sims (A. C.). **Virulence of single basidiospore isolates of Pellicularia filamentosa as affected by pre-culture substrates.**—*Diss. Abstr.*, **17**, 7, p. 1452, 1957.

In an investigation at Ohio State University of the changes in virulence that follow pre-culture of *P. filamentosa* [*Corticium solani*: **36**, p. 343] on certain substrates, single basidiospore isolates were compared on potato dextrose, yeast extract, and basal agars for cultural characters and, after pre-culture on potato dextrose agar, for virulence. A dry-weight basis for determining and standardizing inoculum concentration was developed because basidiospore isolates on the same media at the same temperature differed in w/v.

Basidiospore isolates differed in mycelial weight after culture on a basal medium amended with biotin, thiamine, or inositol, the 2 last-named media inhibiting the growth of 3 isolates. After pre-culture on a biotin+thiamine medium and the inositol medium, 1 isolate (23) was significantly less virulent than after growth on the basal medium. Pre-culture on the biotin+thiamine medium at 20° C. resulted in less virulence, as did, to a less extent, that on the inositol medium at 30° and on the biotin+thiamine one at 30°. Post-emergence damping-off [of unspecified host] was increased significantly by pre-culture on the biotin+thiamine medium.

Isolate 23 and its progeny became less virulent after pre-culture on the vitamin-amended media, but the vitamin and temperature requirements differed. Parent and progeny differed significantly in total mycelium after pre-culture on vitamin-amended media, but not in total post-emergence damping-off after pre-culture on the same media.

Changes in virulence after pre-culture on vitamin-amended media are probably due to physiological rather than to genetical changes.

Touzé (A.). **Recherches sur le métabolisme de Colletotrichum oligochaetum Cav. et de Colletotrichum lindemuthianum (Sacc. et Magn.) Bri. et Cav. II. Synthèse d'un enzyme d'adaptation : la guanidiase.** [Studies on the metabolism of *Colletotrichum oligochaetum* Cav. and of *Colletotrichum lindemuthianum* (Sacc. & Magn.) Bri. & Cav. II. Synthesis of an enzyme of adaptation: guanidiase.] —*C. R. Acad. Sci., Paris*, **245**, 23, pp. 2077–2079, 1 graph, 1957.

Guanidine proved to be an excellent N source for *C. oligochaetum* [*C. lagenarium*: **37**, p. 64], which synthesizes guanidiase, the activity of which, resulting in the hydrolysis of guanidine, reached a peak at pH 10·8. The guanidiase content of the mycelium was most abundant on the 4th day of culture. [*C. lindemuthianum* is mentioned only in the title.]

Nysterakis (F.). **Antagonisme entre auxine et citrulline sur le test Nectria galligena.** [Antagonism between auxin and citrullin on the test *Nectria galligena*.]—*C. R. Acad. Sci., Paris*, **246**, 5, pp. 818–820, 1 graph, 1958.

The author has already shown (*C.R. Acad. Sci., Paris*, **234**, p. 124, 1952) that *N. galligena* makes regular, measurable growth in darkness at 25° C. on Knop's agar at ½ strength without exogenous auxin, and further (*ibid.*, **236**, p. 2433, 1953) that an admixture of biotin entirely suppresses the inhibition of development caused by supplements of β-indoleacetic acid exceeding 2±1 μg./ml. In the experiments here reported citrullin also acted as a powerful antagonist of the growth substance, 4·35 μg./ml. sufficing to annul the inhibitory effect of 43·5 μg. of indole-acetic acid.

Grassi (G. V.). **The biological control of Verticillium albo-atrum R. & B. by various antagonistic microorganisms.**—*Diss. Abstr.*, **17**, 7, p. 1449, 1957.

At Purdue University it was observed that soil amendments stimulated the development of various saprophytes, which multiplied at the expense of pathogens, preventing their growth. The evidence showed that the incidence of wilt [in

unspecified hosts] is related to the number of antagonistic organisms present in muck soil. These were isolated and, when introduced singly into soil inoculated with *V. albo-atrum* plus various amendments to stimulate the development of the antagonists, gave excellent control.

Коснетkova (Mme G. V.). Распространение антагонистических форм грибов рода **Penicillium** в почвах Европейской части Советского Союза. [Distribution of antagonistic forms of fungi of the genus *Penicillium* in the soils of the European part of the Soviet Union.]—*Bull. Soc. Nat. Moscou*, Sect. Biol. N.S., **62**, 3, pp. 77–81, 1957. [English summary.]

In soils from various districts from Murmansk to the subtropical Batumi district there was a rise in the proportion of the penicillin-producing *Penicillium* spp. (up to 12) in the N–S. direction and a fall with a rise above sea level (up to 2,000 m.). The species that produce penicillin fell sharply in subtropical soils, but those present in these soils produced other antibiotics.

Kendrick (W. B.). **Micro-fungi in Pine litter.**—*Nature, Lond.*, **181**, 4606, p. 432, 1958.

At the Botany Dept, University of Liverpool, records of fungi in 3 layers of the A_0 horizon of the podzol at Delamere Forest (of *Pinus sylvestris*), Chesh., were made by direct observation of freshly-sampled needles and by examination of needles washed to remove surface-borne spores and maintained on a nutritive agar for 2 weeks.

Maximal fungal activity was present on the needles of layer F_1 (needles dark, often intact); numerous fruiting structures of several fungi not represented on nutritive media were also noted in this layer. In layer L (undecomposed litter) only *Lophodermium pinastri* was found regularly, but in F_1 *Verticicladium trifidum*, *Helicoma* sp. (to be described as new), and an isolate (1/6) stated to represent a new genus were frequently present. In layer F_2 (needles greyish, fragmentary, compressed) were the mutilated remains of these fungi; basidiomycete mycelium was, however, most frequent in this layer.

Cultural isolation revealed several fungi not seen by direct observation. Of these, *Antennularia* spp., a sterile, dark isolate (3/10), and *Fusicoccum bacillare* occurred with decreasing frequency from L to F_2, while there was a corresponding increase in *Trichoderma viride* and *Penicillium* spp. The isolations were made in March, 1957, but comparable differences between the subhorizons were recorded in all other months.

Jackson (R. M.). **An investigation of fungistasis in Nigerian soils.**—*J. gen. Microbiol.*, **18**, 1, pp. 248–258, 2 graphs, 1958.

At University College, Ibadan, Nigeria, the presence of a fungistatic factor [cf. **36**, pp. 726, 816] in local soils was demonstrated by inoculating agar disks on filter-paper in contact with moist, non-sterile soil with spores of 19 spp. of fungi, all except 3 isolated from soil at Ibadan. After incubation the disks were examined and the percentage germination recorded.

Germination was not inhibited by autoclaved soil or if 0·5% (w/v) glucose was added to the agar. The presence or absence of vegetation and the type of vegetation had little effect on the fungistatic property of the soil. In 2 profiles fungistasis was restricted to the top 40 cm. Of the fungi tested the germination of 11 spp. was significantly inhibited, of 7 unaffected, and of 1 stimulated. These results suggest the occurrence in Nigerian soils of a material inhibitory to fungi, similar to that occurring elsewhere and possibly universally present in soils.

Schönbeck (F.). **Untersuchungen über den Einfluß von Wurzelausscheidungen auf die Entwicklung von Bodenpilzen.** [Studies on the influence of root

excretions on the development of soil fungi.]—*Naturwissenschaften*, **45**, 3, pp. 63–64, 1 fig., 1958.

Of the various crucifers, legumes, and cereals tested at the Botanische Abteilung Madaus, Köln-Merheim, Germany, only oats produced a substance that inhibited the growth of *Byssochlamys nivea* in the rhizosphere [cf. **30**, p. 223]. At a distance of 1–2 mm. round the root tip a zone of inhibition developed, at the periphery of which growth was usually stimulated. The extract also caused a very slight and irregular retardation of growth of *Trichoderma koningii*. On the basis of paper-chromatographic analyses the substance is tentatively identified as a root-tip glucoside.

Verona (O.). **Flocculazione dei materiali argilliformi del terreno ad opera di lieviti mucogeni.** [The flocculation of the argillaceous materials in soil by the action of mucogenous yeasts.]—*Agricoltura ital.*, **66** (N.S. **11**), pp. 1–11, 1 fig., 1 graph, 1957. [French summary.]

In experiments at the University of Pisa, Italy, it was demonstrated that *Cryptococcus laurentii* and *Rhodotorula mucilaginosa* caused flocculation of the argillaceous materials present in soil.

Middelburg (H. A.). **Bemesting en mangaanvergiftiging.** [Manuring and manganese toxicity.]—*Landbouwk. Tijdschr., Wageningen*, **69**, 10, pp. 766–770, 2 fig., 1957. [English summary.]

From field and pot experiments at the Laboratorium voor Landbouwscheikunde van de Landbouwhogeschool, Wageningen, pH appeared to be the principal factor determining Mn availability. Symptoms of toxicity appeared in rape below pH 5·5. Of organic manures tested only farmyard manure and compost raised the soil pH from 4·9 to above 5·5, preventing Mn toxicity; the best results were obtained with compost plus Chilean nitrate. Nitrogen (as NH_4NO_3) markedly increased Mn uptake. The optimal N application for rape and oats rises with increasing soil pH and decreasing Mn availability. Where the latter is high minimal applications of NH_4NO_3 can depress rape yields.

Mayor (E.). **Herborisations mycologiques dans le département du Tarn.** [Mycological herborizations in the Department of the Tarn.]—*Rev. Mycol., Paris*, **22**, 3, pp. 266–282, 3 fig., 1957.

An annotated list of downy and powdery mildews, smuts, and rusts, including 3 new spp., collected by the author in the Monts de Lacaune, Department of the Tarn, France, July–Aug. 1956.

Durrieu (G.). **Sur la répartition de quelques micromycètes dans le sud-ouest et les Pyrénées.** [On the distribution of some micromycetes in the south-west and the Pyrenees.]—*Bull. Soc. Hist. nat. Toulouse*, **91**, 3–4, pp. 307–312, 2 graphs, 1 map, 1956. [Received 1957.]

The 25 pathogenic fungi in this critically annotated list include *Cystopus candidus* [*Albugo candida*: **36**, p. 63] on *Alyssum maritimum* and *Hutchinsia alpina*; *Coleosporium campanulae* [**30**, p. 202] on *Campanula* and *Phyteuma* spp.; *Melampsora lini* on *Limum strictum*, *L. angustifolium*, *L. catharticum*, and *L. alpinum*; *Puccinia buxi* on box [cf. **33**, p. 182]; *P. malvacearum* on *Malva rotundifolia* and other Malvaceae; *P. menthae* on *Mentha*, *Calamintha* [cf. **32**, p. 646; **35**, p. 487], *Nepeta*, *Origanum*, and *Satureia* spp. [cf. **33**, p. 50]; *Polystigma rubrum* on *Prunus spinosa* [cf. **34**, p. 752]; *Lophodermium pinastri* on pine [**31**, p. 209]; and *Rhytisma salicinum* on *Salix* spp. [cf. **33**, p. 450].

Golovin (P. N.). Очерк грибной флоры Кара-Кумов. [Outline of the fungal flora of Kara-Kum.]—*Trans. V. L. Komarov Bot. Inst. U.S.S.R. Acad. Sci.*, Ser. II, **10** (Pl. Crypt.), pp. 179–194, 1956. [Received 1958.]

This is a brief survey of the fungal flora and plant diseases in a comparatively young oasis in the Kara-Kum desert. *Cystopus candidus* [*Albugo candida*] on Cruciferae and *Peronospora schleidenii* [*P. destructor*] on onions are of economic importance. *Sphaerotheca pannosa* is severe on roses. *Erysiphe communis* [*E. polygoni*] on beans [? *Phaseolus* spp.] and other legumes and beetroot, *Puccinia glumarum* [**36**, p. 592] on cereals, *Uromyces striatus* on lucerne, *Melampsora lini* [**36**, p. 187] on flax, and *P. carthami* on safflower are also of economic importance.

Pai (C.-K.). **Notes on the Peronosporaceae in North-eastern China.**—*Acta phytopath. sinica*, **3**, 2, pp. 137–154, 24 fig., 1957. [Chinese. Abs. from English summary.]

From Shenyang Agricultural College the author records 31 spp. (11 new to the region, 1 sp. nov.). Among them are *Sclerospora graminicola* on *Setaria italica*, *Sclerophthora* [*Sclerospora*] *macrospora* on rice [map 287], *Plasmopara viticola* on vine, *Pseudoperonospora cubensis* on cucumber, *P. humuli* on hop [map 14], *Peronospora aestivalis* [*P. trifoliorum*] on lucerne [map 343], *P. manshurica* on soybean, *P. parasitica* on cabbage, *P. schleideni* [*P. destructor*] on *Allium fistulosum*, and *Bremia sonchicola* [*B. lactucae*] on lettuce.

Golovin (P. N.). Монографический обзор рода **Leveillula Arnaud** (Мучнисторосяные грибы-сем). **Erysiphaceae.** [Monographic survey of the genus *Leveillula* Arnaud (parasitic fungi-fam. Erysiphaceae).]—*Trans. V. L. Komarov Bot. Inst. U.S.S.R., Acad. Sci.*, Ser. II, **10** (Pl. Crypt.), pp. 195–308, 50 fig., 1956. [61 refs. Received 1958.]

This is a detailed survey of *Leveillula*, the first 18 pp. being devoted to history, morphology, ecology, &c., and the remainder to descriptions of 40 spp. and many forms, and 13 spp. of *Oidiopsis*. The genus is divided into 6 sections. *L. taurica* has been split into species for each host family and formae for each host genus, existing formae being transferred and many new ones proposed. *L. balsaminacearum* sp. nov. is used for Balsaminaceae, *L. compositarum* sp. nov. for Compositae with f. *helianthi* f. nov. on sunflower, f. *scorzonerae* (Kuprev) n. comb. on *Scorzonera hispanica*, and f. *scorzonerae tau-saghyz* (Solk.) n. comb. on *S. tau-saghyz*, *L. leguminosarum* on *Dolichos lablab*, with f. *lentis* f. nov. on lentil, f. *onobrychidis* f. nov. on sainfoin and other *Onobrychis* spp., f. *phaseoli* f. nov. on *Phaseolus aureus*, and f. *viciae* (Jacz.) n. comb. on vetches, *L. saxifragacearum* f. *ribis* f. nov. on *Ribes* sp., *L. cruciferarum* ? sp. nov. on Cruciferae, *L. cucurbitacearum* ? sp. nov. on vegetable marrow, cucumber, and *Cucurbita* sp., *L. linacearum* ? sp. nov. on flax, *L. umbelliferarum* f. *dauci* f. nov. on carrot, and *L. solanacearum* f. *capsici* (Berger) n. comb. on capsicum, f. *lycopersici* (Berger) n. comb. on tomato, f. *melongenae* (Berger) n. comb. on eggplant, and f. *solani* n.f. on potato. [There are no Latin diagnoses.]

Golovin (P. N.). Материалы к монографии мучнисто-росяных грибов семеиство **Erysiphaceae**) в СССР. [Material for a monograph of the parasitic fungi (family Erysiphaceae) in U.S.S.R.]—*Trans. V. L. Komarov Bot. Inst. U.S.S.R., Acad. Sci.*, Ser. II, **10** (Pl. Crypt.), pp. 309–366, 15 fig., 1956. [39 refs. Received 1958.]

Detailed treatment is given to 3 genera of the Erysiphaceae [**7**, p. 346]. *Arthrocladia* gen. nov. [without a Latin diagnosis] is taken in part from *Calocladia* and in part from *Microsphaera*, the type species being *A. lycii* (syn. *Erysiphe lycii* Lasch.). The perithecial appendages in *Arthrocladia* are branched regularly, with septa at the

nodes, reminiscent (visually) of *Penicillium* conidiophores, or even more like the branching of *Cladophora* sp.

There is a key to 13 *Podosphaera* spp., which are described in detail. *P. oxyacanthae* f. *piri* f. nov. is used for the fungus on pear and *Pyrus ussuriensis*. A key is given to the 19 described spp. of *Microsphaera* known in U.S.S.R.

Kharitinova (Mme Z. M.). Сравнительное изучение грибов **Rhizoctonia solani Kühn** и **Rh. aderholdii. (Ruhl.) Kolosh.** [Comparative study of the fungi *Rhizoctonia solani* Kühn. and *R. aderholdii* (Ruhl.) Kolosh.]—*Trav. Soc. Nat., Moscow-Leningrad*, **43**, 1, pp. 75–81, 3 fig., 1958.

At the Leningrad Institute for Plant Protection a comparison between *Rhizoctonia* [*Corticium*] *solani* and *R. aderholdii* [*Moniliopsis aderholdii*: **36**, p. 485] showed that the 2 fungi varied according to geographical conditions. It is suggested that *M. aderholdii* may have to be divided into 2 species; isolates from cabbage and cotton in Azerbaijan grew more rapidly and had darker mycelium than those from the same hosts in the Leningrad region, the opt. temp. for growth being 21–30° C. and 13–21°, respectively.

Amici (A. M.), Bertini (S.), & Joly (S[ebastiana]). **Su tre ceppi di Attinomiceti isolati da terreni dello Stato di San Paolo (Brasile) (viridis-griseus-scabies).** [On three strains of actinomycetes isolated from soils in the State of São Paulo (Brazil) (*viridis-griseus-scabies*).]—*Ann. Microbiol., Milano*, **7**, 5–6, pp. 3–11, 6 fig., 1957. [English summary.]

The morphological, cultural, and biological characters of these 3 strains of actinomycetes are described and referred to series *viridis* (V/7), *griseus* (V/8), and *scabies* (V/9), respectively [cf. **37**, p. 140]. They may be described as new species in these series, or be named by initial letters (sigla) after the series name. According to Baldacci's criterion [loc. cit.], the latter method appears preferable to avoid further taxonomic complication in this group.

Petersen (L. J.), Gerhold (N. R.), & Weinhold (A. R.). **Two methods of collecting rust urediospores in the field.**—*Plant Dis. Reptr*, **41**, 12, pp. 973–974, 3 fig., 1957.

From the Colorado Agricultural Experiment Station, Fort Collins, 2 devices are described for the collection of uredospores: a wheel-mounted, petrol-powered pump unit and a portable vacuum cleaner unit powered by 2 flashlight batteries. Both have a cyclone separator micro-organism collector and are capable of collecting several hundred mg. spores/hr.

Limasset (P.). **Autoréproduction de quelques virus des végétaux.** [The autoreproduction of some plant viruses.]—*Expos. act. Biol. cell.* (*Méc. d'autoréprod.*) 6, pp. 175–252, 1957. [490 refs.]

This review covers the present state of knowledge of the autoreproduction of plant viruses, an introductory section being followed by one on autoreproduction in the plant (pp. 180–217), including fundamental ideas on virus nucleoproteins, experimental data reported in the literature, and interpretations and hypotheses, and by another on autoreproduction in the insect vector (pp. 218–231), dealing with the viruses of rice stunt [rice dwarf], clover club leaf, aster yellows, tumour wound [clover big vein], and maize stunt. In the concluding section (pp. 231–233) reference is made to the prospects of control.

Blattný (C.). Некоторые результаты изучения вирусных болезней растений в Чехословакии. [Some results of the study of virus diseases in Czechoslovakia.]—Тр. Ин-та генет. АН С.С.С.Р. [*Trud. Inst. genet. Acad. Sci.*

U.S.S.R.], *1956*, 23, pp. 317–320, 1956. [Abs. from *Referat. Zh. Biol.*, *1957*, 17, p. 181, 1957.]

A number of viruses (pea virus 1 [pea enation mosaic virus], pea virus 2 [bean yellow mosaic virus (str.)], and potato crinkle mosaic viruses [potato viruses X + A]) are stated to be to some extent seedborne. Serological analysis and grafting potato seedlings on tobacco are recommended for the determination of potato mosaic. For the diagnosis of hop [virus] diseases good results were obtained with electrophoresis of the nucleoproteins of healthy and diseased plants.

Schmelzer (K.). **Untersuchungen über den Wirtspflanzenkreis der Tabakmauche-Virus.** [Studies on the host plant range of the Tobacco 'mauche' virus.]—*Phytopath. Z.*, **30**, 3, pp. 281–314, 8 pl., 1957. [23 refs.]

Further studies on tobacco 'mauche' virus at the Institut für Phytopathologie, Aschersleben, Germany [**36**, p. 450], disclosed a very wide host range. Of 539 plant species tested by sap inoculation, 192 (35·6%) reacted by systemic and 189 (35·1) by local infection, the former predominating among the Hydrophyllaceae, Solanaceae, Primulaceae, and Linaceae, and the latter in the Cucurbitaceae and Leguminosae. Tests on Rosaceae and Gramineae were negative. Most of the hosts were dicotyledons, but a few belonged to Commelinaceae (*Tradescantia crassula*, *T. fluminensis*, and *Zebrina pendula*) and Liliaceae (*Gasteria maculata* and *G. verrucosa*). In all, 53 families included susceptible species and 17 none.

Compared with other viruses, 'mauche' shows a strong tendency to development in a latent form with ill-defined symptoms, closely resembling those of tobacco streak virus [**28**, p. 85] during the first weeks. However, premunity experiments failed to establish a relationship between the viruses.

The host ranges of 'mauche', tobacco ring spot, cucumber mosaic, tobacco necrosis, lucerne mosaic, and tobacco mosaic viruses [cf. **19**, p. 668; **26**, p. 32] were found not to overlap completely. The range of tobacco etch coincided largely with that of the other viruses, while tomato ring spot appeared to differ scarcely at all from 'mauche' in its hosts. The great majority of hosts of all 7 viruses are also capable of supporting the increase of 'mauche'. It may, therefore, be deduced, with reasonable probability, that a species susceptible to one or more of these viruses will react similarly to 'mauche'. On the basis of its symptoms and other characters it is regarded as a new virus and named *Annulus behrensiansus*.

Kiewnick (L.). **Zum Auftreten der Tabakmauche in Mitteldeutschland.** [On the occurrence of Tobacco 'mauche' in central Germany.]—*Ber. Inst. Tabakforsch. Dresden*, **4**, 1, pp. 51–69, 5 fig., 1957. [Russian and English summaries. 16 refs.]

Following a brief review of the literature and a description of the symptoms of tobacco 'mauche' virus [see above], a tabulated survey is given of recent observations on its distribution, which covers all the areas where the crop is cultivated in Brandenburg, Mecklenburg, Saxony, Saxe-Anhalt, and Thuringia. Particularly heavy losses occurred in the Havana IIc and Geudertheimer vars. in the Oder Valley.

In greenhouse inoculation experiments at the Institut für Tabakforschung, Dresden, where the virosis was detected for the first time in 1955, a strain from the Netherlands [**36**, p. 281] proved to be much more virulent than several German isolates; the incubation period of the former on Samsun tobacco was also shorter (8–10 as against 12–14 days). All the *Nicotiana* spp. and commercial tobacco vars. tested were more or less susceptible, though *N. glauca*, *N. trigonophylla*, *N. alata*, and *N. sanderae* developed only local symptoms.

Schuster (G.). **Untersuchungen über die Möglichkeiten zum frühzeitigen Nachweis von Pflanzenkrankheiten mit Hilfe der Anwelkmethode. II. Das Transpira-**

tionsverhalten virusinfizierter Pflanzen der Gattungen Nicotiana, Datura und Hyoscyamus. [Investigations into the possibility of early demonstration of plant diseases, using the wilt method. II. The transpiration of virus-infected plants of the genera *Nicotiana*, *Datura*, and *Hyoscyamus*.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **11**, 12, pp. 240–246, 1957. [English and Russian summaries.]

The wilt method, in which the transpiration rate is observed (by weighing) in cut plant shoots sealed with paraffin wax, has proved a useful tool in studying the physiological status of plants grown under various conditions (A. Arland, *S.B. dtsch. Akad. Landw. Wiss.*, **5**, 6, 1956).

At the Institut für Phytopathologie, Karl Marx University, Leipzig, the author applied it to plants of *Hyoscyamus niger*, *Datura stramonium* var. *inermis*, and *Nicotiana* spp. and vars. 4 weeks after inoculation with potato virus X and potato virus Y, separately or together. In general all infected plants had a considerably higher transpiration rate than the controls, and it rose with the severity of infection. The highest rates occurred with the mixed infections. It is concluded that virus infection lessens the physiological resistance of the plants to water loss. The method is, however, not suitable for revealing symptomless infections or those with weak symptom expression as the increase is then too small for reliable measurement.

Semal (J.). **Virus transmission by Dactynotus cichoricola H.R.L., a new aphid on Chicory.**—*Nature, Lond.*, **181**, 4610, p. 721, 1958.

At the Agronomical Institute, Gembloux, Belgium, *D. cichoricola* experimentally transmitted a strain of cucumber mosaic virus obtained from chicory, after feeding for 1 min. on infected tobacco leaves, to Blanc hâtif cucumber and Samsun tobacco. None of the 6 aphid-inoculated chicory (var. *foliosum*) plants became infected, but 2 of 5 plants displayed typical symptoms when inoculated with infectious tobacco sap mixed with carborundum. When aphids fed 1 min. on beet leaves infected by beet mosaic virus were transferred to 3 beet seedlings var. Kleinwanzleben E, symptoms appeared on 1 plant after 13 days.

Tollenaar (D.). **Phytophthora palmivora of Cocoa and its control.**—*Netherlands J. agric. Sci.*, **6**, 1, pp. 24–38, 5 fig., 1958. [44 refs.]

A review of the literature covers the life-cycle, factors influencing spread and incidence, and losses. In the section on control brief reference to older methods is followed by an extensive discussion of mist-blowing [**35**, p. 663].

Guyot (L.) & Massenot (M.). **Observations et expérimentations sur la rouille noire des céréales et des Graminées au cours des années 1954 à 1956.** [Observations and experiments on black rust of cereals and Gramineae during the years 1954–56.]—*Ann. Épiphyt.*, **8**, 3, pp. 271–303, 1957.

In further work at the École Nationale d'Agriculture, Grignon, France, on the distribution of physiologic races of *Puccinia graminis* [cf. **35**, p. 754] in France, Algeria, and Morocco during 1954–56, race 21 was identified 56 times, race 133 nine times, races 14 and 17 seven times, race 75 three times, race 186 twice, and races 24, 34, 116, and 122 once each. In every instance race 75 was represented by biotype 75 B. Once 186 was represented by 186 B. The virulence of race 34, the most virulent found, approaches that of races 15 and 40. Race 14 is the least virulent.

In greenhouse experiments some reputedly highly resistant wheat vars. (*GN = 80–3*, Guatrache, Oro, Thatcher) were attacked only by race 34. On the whole, the behaviour of Étoile de Choisy was satisfactory.

Race 21 has the largest number of hosts among wild Gramineae; it was obtained from *Aegilops ovata*, *Agropyron marginatum*, *Bromus fasciculatus*, *Elymus caput-medusae*, and *Hordeum murinum*.

In the mountains of Morocco (Middle Atlas and Great Atlas, at 1,450–2,100 m.) *P. graminis tritici* severely infects the perennial *Agropyron marginatum*, *Bromus ramosus benekini*, and *Haynaldia hordeacea* in regions where *Berberis vulgaris* is rare. These grasses carry races 17, 21, 24, and 75, which are those most commonly found on wheat in N. Africa [**35**, p. 816] and in France. These mountainous regions are probably permanent foci of *P. graminis* from which the epidemics of black rust in the plains of N. Africa and France have their origin, at least in part.

Bromus maximum and *Hordeum murinum* were much more susceptible to strains of race 21 from N. Africa than to strains from metropolitan France.

A new taxon, *P. graminis* f.sp. *dactylidis*, is proposed for a rust on various wild grasses, but not cereals, which attacks *Dactylis glomerata* [cf. **36**, p. 592] strongly, *Arrhenatherum* and *Poa* a little, *Lolium* hardly at all, and *Agropyron*, *Agrostis*, and *Phleum* not at all.

Aecidia of *P. graminis* on *Berberis vulgaris* were studied in the southern Alps (the upper valleys of the Durance and the Ubaye). In no instance were the aecidia associated with black rust of wheat; rust developed heavily and invariably on grasses growing in the vicinity.

The distribution of the physiologic races of *P. graminis tritici* in France, N. Africa, the Lebanon, and Spain [**34**, p. 356] are tabulated according to the year, the geographical area, and the wild hosts.

Niemann (E.). **Kaltwasserquellung und anaerobes Benetzungsverfahren zur Flugbrandbekämpfung bei Weizen.** [Cold water soaking and the anaerobic wetting process for control of loose smut of Wheat.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **10**, 2, pp. 26–30, 3 graphs, 1958.

At the Institut für Getreide-, Ölfrucht- und Futterpflanzenbau, Kiel-Kitzeberg, the author compared anaerobic wet storage and cold water soaking for the control of *Ustilago tritici* [*U. nuda*: cf. **37**, pp. 157, 344]. Anaerobic storage at 2·5–44·5° C. was effective, the fall in germinability being less at the higher temps.: the required durations of treatment at 2·5, 23·5, and 44·5° were 975, 156, and 4 hr., respectively. Water soaking over prolonged periods at 3·8–47° led to a considerable fall in germinability, the lower temps. being the worst. This method shows little promise.

Redox potential and pH readings taken during the various soaking treatments indicated that the fungicidal effect resulted from anaerobic respiration in the grain, while the fall in germinability was primarily attributable to microbial rotting.

Gaskin (T. A.), Caldwell (R. M.), Compton (L. E.), & Schafer (J. F.). **Race 20 of Ustilago tritici.**—*Plant Dis. Reptr*, **41**, 12, p. 975, 1957.

A culture of *U. tritici* [*U. nuda*] maintained at Purdue University, Lafayette, Indiana, since 1938 is distinct from previously described races in attacking only Purdue No. 1 (C.I. 11380) of the differential varieties, and is designated race 20 [**33**, p. 473]. It is not of economic importance. The only other wheat known to be susceptible is Gladden.

Purdy (L. H.). **Results of regional seed treatment tests for the control of seed-borne and soil-borne common bunt of winter Wheat in the Pacific Northwest for the year 1957.**—*Plant Dis. Reptr*, **41**, 12, pp. 976–979, 1957.

Of the 28 seed treatments tested against bunt (*Tilletia caries* and *T. foetida*) on Orin winter wheat at 8 locations [cf. **36**, p. 391] only 3 failed to provide adequate control. HCB formulations gave relatively good control of combined seed- and soil-borne infection in all tests and PCNB (terraclor) in 3 out of 5; the mercurials failed to protect against soil-borne infection.

Chu (Y.), To (S.-M.), & Wang (L.). **The proper use of arsenic for treating Wheat seed.**—*Acta phytopath sinica*, **3**, 2, pp. 177–182, 1957. [Chinese. Abs. from English summary.]

Further studies were carried out at the E. China Agricultural Research Institute, Nanking [cf. **37**, p. 29], on seed disinfection with arsenic, the most promising and practical substitute for organic Hg. Since it has been employed in Kansu province infection by *Tilletia caries* has fallen from 11·8 to 0·01%. Seed dressed with less than 0·005% w/w of arsenic can be stored during hot weather for over 100 days without harm, and sown regardless of the soil moisture or temperature, but with such a small dressing at least 2 months' storage is needed to kill the spores.

If more than 0·01% arsenic is used and seed stored for several months a lower R.H. is needed and the seed must be sown in soil of over 60% of the water holding capacity to ensure ready germination. Seed can then stand 0·8% arsenic, but not above 0·05% if the soil moisture is below 43%. Seed treated with 0·05% arsenic can be stored or sown safely if air or soil temperature is below 10° C.

Meiners (J. P.) & Hardison (J. R.). **New host records for dwarf bunt in the Pacific Northwest. II.**—*Plant Dis. Reptr*, **41**, 12, pp. 983–985, 2 fig., 1957.

New grass hosts of *Tilletia contraversa* [cf. **36**, p. 459] are *Agropyron amurense*, *A. dasystachyum*, *A. riparium*, and *Elymus glaucus* (all infected by inoculation), and *E. triticoides*, *Festuca idahoensis*, and *Koeleria aristata* (naturally infected). Dwarf bunt was also found on *A. repens* for the first time in N. America.

Parmentier (G.). **Un nouvel aspect de la lutte chimique contre Erysiphe graminis (D.C.).** [A new aspect of the chemical control of Erysiphe graminis DC.]—*Parasitica*, **13**, 4, pp. 155–157, 1957.

At the Station de Phytopathologie de l'Etat, Gembloux, Belgium, greenhouse barley plants were sprayed with distilled water, distilled water+wetter (alkyl aryl sulphonate), sodium nitrate, and sodium nitrate+the same wetter when 5 cm. high (preventive treatment), 100 hr. later (curative treatment), or on both occasions, and inoculated with *E. graminis* [**36**, p. 395] 24, 48, 72, or 96 hr. after the 1st treatment. Taking infection on untreated plants as 100, those following these treatments [results from different dates of inoculation being combined] were, respectively: 98, 100, 101; 86, 34, 25; 106, 98, 96; and 90, 14, and 6.

It is concluded that a wetter alone can reduce infection by *E. graminis* to an important extent [loc. cit.]. Preventive treatment is not very effective. The efficacy of the curative treatment is mainly due to the wetter, whether used with a fungicide or a nutrient salt such as sodium nitrate.

Neururer (H.). **Die Streifen- und Netzfleckenkrankheit der Gerste.** [Stripe and net blotch disease of Barley.]—*Pflanzenarzt*, **11**, 1, pp. 3–4, 2 fig., 1958.

Stripe disease (*Helminthosporium gramineum*) [**23**, p. 477] and net blotch (*H.* [*Pyrenophora*] *teres*) of barley are reported in Carinthia, Austria, and briefly described.

Simons (M. D.). **Physiological races of crown rust of Oats identified in 1956–57.**—*Plant Dis. Reptr*, **41**, 12, pp. 970–972, 1957.

Since the last compilation [cf. **36**, p. 396] 4 new races of *Puccinia coronata* have been discovered, 290 [see below], 291, and 292 in Argentina, and 293 in Canada. They cause severe infection of Landhafer and Santa Fé but differ from other N. American races (263, 264, and 276) attacking these varieties in their inability to parasitize Trispernia and Bondvic. Of the 482 isolates (23 races) from the U.S.A., Canada, and Mexico, 33% were identified as race 202, 14% as 203, 21% as 213 and 258 together, and 16% as 216. Races attacking Victoria comprised 44% of the total,

compared with 18% in 1955. Two collections from Manitoba and one from N. Dakota contained the extremely virulent 264.

Simons (M. D.), Luke (H. H.), Chapman (W. H.), Murphy (H. C.), Wallace (A. T.), & Frey (K. J.). **Further observations on races of crown rust attacking the Oat varieties Landhafer and Santa Fé.**—*Plant Dis. Reptr*, **41**, 12, pp. 964–969, 1957.

In investigations by the U.S. Dept Agric. and the Iowa and Florida Agric. Exp. Stations no seedling resistance to race 264 of *Puccinia coronata* [**37**, p. 350 and above] was found among the 5,000 lines of cultivated oats in the World Oat Collection, but there was good resistance in some diploid and tetraploid lines. All the 115,000 seedlings derived from irradiated material were susceptible.

Limited epiphytotics of races attacking Landhafer and Santa Fé occurred in 1957 at Gainesville, Florida, where the previously undescribed race 290 [see above] predominated, and at Quincy (mainly 264), where the tetraploid C.I. 7233 and the hexaploids C.I. 7171 and 7172 were outstanding for mature plant resistance. Light infection on Landhafer and Santa Fé was present in Illinois, Indiana, Ohio, Wisconsin, Michigan, and Iowa later in the season.

Singh (G.). **Factors affecting the incidence of smuts in Oats.**—*Indian J. agric. Sci.*, **27**, 11, pp. 185–204, 7 fig., 1957. [44 refs.]

In glasshouse experiments at the New York State College of Agriculture, Cornell University, Mabel oat seed inoculated with *Ustilago avenae* and *U. kolleri* [*U. hordei*] was grown at 4 different soil temperatures. The percentage germination was the same throughout, but at 55° F. and about 66° (controls) 66% of the plants reached maturity, compared with only 52% at 75° and 53% at 85°, infection being highest (100%) at 75°. Plants exposed to 8 hr. light daily for 1½ months developed 92% infection; those receiving 16 hr. (daylight supplemented by artificial light), 57%.

It is concluded that any factor, internal or external, which increases the growth rate of the host relatively more than that of the pathogen, or inhibits the fungus while allowing normal growth of the host, will prevent most of the heads from becoming infected even in a variety normally regarded as highly susceptible.

Storey (H. H.), Howland (Ryland) (Audrie K.), Hemingway (J. S.), Jameson (J. D.), Baldwin (B. J. T.), Thorpe (H. C.), & Dixon (G. E.). **East African work on breeding Maize resistant to the tropical American rust, Puccinia polysora.**—*Emp. J. exp. Agric.*, **27**, 101, pp. 1–17, 1 pl., 1958.

Severe attacks of *P. polysora* on maize in tropical E. Africa [**37**, pp. 6, 38] are capable of causing heavy losses. At the E. African Agriculture and Forest Research Organization, Mugaga, Kenya, imported maize plants from Central America and the Caribbean [**37**, p. 159], with the hypersensitive type of resistance, have been used in the development of resistant lines adapted to local conditions. These are pure for one or other of 2 genes, Rppl, conferring high resistance to race EA.1 but not EA.2, and Rpp2, conferring a lesser but effective resistance to both races. EA.1 is the only race encountered so far in the field. A stock of pure-breeding, resistant maize lines is being built up to aid in the differentiation of other races which may appear and to serve as a source of resistant genes.

Haunold (E.) & Neururer (H.). **Zwei Blattfleckenkrankheiten an Mais.** [Two leaf-spot diseases of Maize.]—*Pflanzenarzt*, **11**, 3, pp. 37–38, 2 fig., 1958.

The author reports the occurrence of *Helminthosporium turcicum* [map 257: cf. **36**, p. 693] and *H. carbonum* on maize, at Gleisdorf, Oststeiermark, Austria, in 1957. Control by cultural practices is recommended for the present, though the use of resistant lines is envisaged.

ZANARDI (D.). **Eccezionale attacco di Sclerospora macrospora Sacc. sul Mais.** [An exceptional attack of *Sclerospora macrospora* Sacc. on Maize.]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 12–15, 1 pl., 1957. [English summary.]

In 1957, in the province of Pavia, Italy, the maize hybrids Wisconsin 464 and U 41 and the local var. Marano Vicentino developed up to 50% infection by *S. macrospora*, not previously recorded there within living memory [cf. **29**, p. 611].

ERWIN (D. C.) & CAMERON (J. W.). **Susceptibility of five Sweet Corn varieties to Pythium graminicola.**—*Plant Dis. Reptr*, **41**, 12, pp. 988–991, 1957.

At the University of California Citrus Experiment Station, Riverside, an isolate of *P. graminicola* [**35**, p. 672] produced root rot in 5 maize varieties grown in infested soil in the greenhouse. In the field natural infection occurs mainly on the early vars. Luther Hill and Wisconsin 23 when grown in late summer; the mid-season Purdue 39A and 51B and the late Iowa 2,000 are apparently more tolerant, but all were equally susceptible under greenhouse conditions.

HEBERT (T. T.) & KELMAN (A.). **Factors influencing the germination of resting sporangia of Physoderma maydis.**—*Phytopathology*, **48**, 2, pp. 102–106, 4 graphs, 1958.

In these studies at N. Carolina State College, Raleigh [cf. **13**, p. 225; **37**, p. 350], resting sporangia of *P. maydis* were obtained by grinding diseased portions of dried maize leaves. Cardinal temps. for spore germination were 18, 28, and 36° C., the min. being unusually high. Opt. pH was 8·5–9, with a min. near 3 and a max. near 10. No germination occurred without some light, another unusual feature, and it increased up to 12 ft.-candles, though not above this [**30**, p. 463]; O was necessary for the response to light. The sporangia germinated in the absence of CO_2.

MESSIAEN (C. M.). **Richesse en sucre des tiges de Maïs et verse parasitaire.** [Sugar content of Maize stalks and parasitic lodging.]—*Rev. Path. veg.*, **36**, 4, pp. 209–213, 1 graph, 1957.

At the Station de Pathologie Végétale du Sud-Ouest, Pont-de-la Maye, Gironde, France, the author attempted to ascertain whether there is any correlation between the lack of sugars in the roots of maturing maize plants and the susceptibility of roots and stalks to fungi causing lodging [cf. **36**, pp. 184, 774]. Six simple hybrids, 1 double hybrid, and 2 populations were used; the susceptible double hybrid M 706 was submitted (1) to removal of the ear after fertilization, which greatly increases the sugar content in the stalk base, and (2) to reduction of the leaf surface by half to reduce sugar production. The soil at one experimental site had not before borne maize and the plants were inoculated with *Colletotrichum graminicola*; at the other some of the plants were inoculated with *Gibberella zeae* in 1956, but not in 1957. In the 1st experiment the percentage of stalks attacked by *C. graminicola* was determined; in the 2nd the proportion of stalks rotted by any of a parasitic complex including *G. zeae*, 70%, *C. graminicola*, 16%, *Phaeocytosporella* [*Phaeocytostroma*] *zeae*, 10%, and various and undetermined, 4%, was ascertained. The sugar content of the base of the stalk was assayed by the refractive index of the sap.

The results obtained in 1957 showed clearly that resistance to infection occurs when the sugar content is over 5%. A high correlation was established between susceptibility to *C. graminicola* and susceptibility to the fungal complex in which *G. zeae* predominated.

LIN (K.-R.) & LIU (G.-J.). **On the overwintering of Rice blast (Piricularia oryzae Bri. et Cav.) in Whei-li district, Szechuan.**—*Acta phytopath. sinica*, **3**, 2, pp. 201–207, 2 graphs, 1957. [Chinese. Abs. from English summary.]

In the vicinity of the Szechuan Agricultural Research Institute, where the winter

is not severe, mycelium of *P. oryzae* [**37**, p. 161] can hibernate well in rice straw, especially if not too wet, and though few overwintered conidia germinate, a 2–3 mm. rainfall in spring starts new sporulation. Peaks of spore density occur in the air over rice fields during 6–10 and 18–22 Sept., when blast of culms and ears, respectively, are at a max. Rice straw in water or mud for 20 days yields no viable mycelium.

Lin (K.-H.) & Chu (M.-L.). **The relation of Fusarium species to yellow shoot of Citrus.**—*Acta phytopath. sinica*, **3**, 2, pp. 169–176, 1 fig., 1 graph, 1957. [Chinese. Abs. from English summary.]

In studies at the S. China College of Agriculture to determine the part played by *Fusarium* in the yellow shoot virus disease of citrus [**37**, p. 41] wound inoculations were made with 4 *F.* isolates from rotted roots (3 from a yellow shoot affected tree, 1 from a healthy tree) into roots of healthy trees and of others affected by yellow shoot. After 20–66 days most of the inoculated roots were rotted to a varying degree according to the vigour of the tree and the *F.* sp. used. Similar inoculations with *Aspergillus* and *Trichoderma* spp. from the soil caused no rotting. Two of 14 Ponkan tangerine orange trees in drums developed root rot and yellowing 4 months after soil inoculation with *Fusarium*, subsequent recovery by formation of new fibrous roots being followed by recurrence of the disease. It would appear, therefore, that *F.* spp. can attack the roots of citrus and augment the effects of yellow shoot disease.

Agarwala (R. K.) & Tandon (R. N.). **Studies of the anthracnose of Lime trees in Uttar Pradesh.**—*Indian J. agric. Sci.*, **27**, 11, pp. 205–209, 1 fig., 1957.

In inoculation experiments at the University of Allahabad *Gloeosporium limetticola*, isolated from lime (*Citrus aurantiifolia*) trees [**35**, p. 478], readily attacked the young twigs, leaves, flowers, and buds. Three applications of Bordeaux mixture (5:5:50) or 0·33% perenox, the 1st in the last week of June, then during and after the rainy season, gave satisfactory control. All infected material attached to the plants or lying on the ground should be collected and burnt at least 3 or 4 times during the rainy season.

Carpena (O.), Guillén (M. G.), & Sánchez (J. A.). **La clorosis férrica del Limonero I, II.** [Iron chlorosis of the Lemon tree, I, II.]—*An. Edafol. Fisiol. veg.*, **16**, 2, pp. 259–292, 3 col. pl., 1 fig., 1957. [English summaries. Received 1958.]

At the Instituto de Edafología y Fisiología Vegetal, Murcia, Spain, a study was made of Fe deficiency in the Verna lemon [**34**, p. 365], which is widely grown in that region. Chlorotic leaves contained excess K and reduced Ca [cf. **29**, p. 24]. Soil treatment with $FeSO_4$ was effective on plantations of young trees. Soil and foliage applications of the chelates ferralkine GC, versenol, and sequestrene chel 330-Fe produced encouraging results on seriously affected trees. For spraying, the chemicals were used at 1·5% with addition of 1% of a non-ionic surface active agent. The $FeSO_4$ was acidulated to prevent hydrolysis.

Dadant (R.). **Le pourridié du Caféier à Madagascar.** [Root rot of Coffee in Madagascar.]—*Café, Cacao, Thé*, **1**, 3, pp. 126–131, 5 fig., 1957.

An account is given in semi-popular terms of the root rot of coffee caused in the eastern areas of Madagascar by *Clitocybe tabescens* [**34**, p. 451], the chief points dealt with being the damage produced, the causal organism, and control (by uprooting where intensive cultivation is practised, and by ringing where the cultivation is extensive).

Activité de l'I.R.C.T., 1955. [Work of I.R.C.T., 1955.]—*Cot. et Fibr. trop.*, **12**, 1, pp. 1–171, 34 fig., 7 graphs, 1957.

In the report [cf. **33**, p. 602] from the Bambari Station, French Equatorial Africa (pp. 9–23), a summary is given of treatment tests of cotton seed with granopera

[cf. **34**, p. 673] which confirmed its efficacy. When used on linted seed it increased the stand; disinfection [diseases not specified] was more effective with delinted than with linted seed, the progeny being more vigorous.

In selection of 5 varieties and hybridization of 22 lines for resistance to bacterial wilt (*Xanthomonas malvacearum*) [cf. **33**, p. 602] 35,000 plants were tested by spraying with infected sap in August. The improvement of resistance was based on the transfer of genes B2+B3 to good commercial varieties. During the year 33 new hybrids homozygous for resistance were constituted. Gene B1 was found to be associated with a discoloration of the cotyledons, followed by a variegation of the new leaves. These symptoms later disappeared. In the F_3 direct from the hybrid series 31 (Banda×U4–5143×51–296) 4 pure strains graded '3–6' were obtained. Since this type of resistance cannot be conferred by B2 or by B2+B3, it is concluded that B2 has now been associated experimentally with a new factor, X, which is independent of B2 and probably derives from U4–5143.

Ten varieties with known leaf reactions were submitted to boll inoculation by various methods. The best and most regular results were obtained by rubbing a carpel on a 2-week-old boll with a toothbrush dipped in inoculum. Spraying inoculum violently into the corolla or the calyx after petal-fall gave very irregular results. Five experiments over 3 years by the toothbrush method showed that there was a direct relationship between the resistance of the leaf tissues and that of the branches and bolls. In the experimental conditions and with the particular genes studied the highest resistance was given by B2+B3, after which came B7, BP52, and B2.

In the northern part of the sector, where the rains are more regular than they are in the centre and the important falls are in Sept.–Oct., favouring boll rots (*X. malvacearum*, *Diplodia gossypina*, and *Glomerella gossypii*), varieties of the Allen type appear to succeed best. In the central region Allen 150 is appreciably inferior to K-9. In M'bomou, from Ouango to Rafai, Allen 150 shows a high production potential.

At Madingou Station, Middle Congo (pp. 125–139), each time *Urena lobata* reached a state of permanent wilt (5 times between Jan. and Mar.) due to the erratic weather, there was a sharp increase in the rate of disease caused by *Macrophoma* [*Physalospora urenae*: **33**, p. 482]. *Urena* from Nigeria was already 100% infected at Malolo at the end of Feb. after the 3rd wilting, whereas common *Urena* (20% at Malolo and 5–10% at the Station) was harvestable with no more than 15% infection up to the middle of Mar. after 4½ months' growth. Turgescence of the tissues increased resistance, but there was some evidence that other factors, mainly the principal cations, may intervene concurrently. All the experimental evidence confirmed the close relationship (correlation 0·5–0·6) between growth activity and the disease, the plants usually being most diseased when growth had been most rapid and the yields greatest. K tended to reduce the disease, lime and Mg to increase it. An application of farmyard manure at 50–60 metric tons/ha. considerably increased yields without appreciably increasing infection. Mn toxicity of the soil was not a determining cause.

In selection work with nearly 300 lines it was confirmed that late varieties of *Urena* with an almost perennial habit are the most resistant.

Plants of *U. nigeria* from seed from diseased and healthy fields developed the same amounts of canker, but on the former the cankers appeared 10–24 days earlier than on the latter. Of the plants attacked at the collar, 175 were from healthy seed and 1,278 from diseased, the corresponding figures for those bearing stem infections being 158 and 80.

Hsu (J.-S.) & Chien (T.-H.). **The protective effect of some growth-stimulating substances and minor elements on Cotton seedling diseases.**—*Acta*

phytopath. sinica, **3**, 2, pp. 183–191, 1957. [Chinese. Abs. from English summary.]

At Nanking Agricultural College, in 1955, soaking cotton seed in potassium bromide (0·3%), hydroquinone (0·3), and manganous sulphate (0·1) reduced the percentage of seedling disease from 100 to 55, 59, and 75, respectively, and increased the rate and amount of germination; ethyl mercuric phosphate (0·05), nicotinic acid (0·01), and 2,4-D (0·5 p.p.m.) reduced disease to 45, 65, and 81%. In 1956 the first 3 chemicals and nicotinic acid reduced disease from 100% to 83, 47, 73, and 68%, respectively. None of these proved toxic to *Rhizoctonia* [*Corticium*] *solani* [cf. **37**, p. 43], *Colletotrichum* [*Glomerella*] *gossypii*, or *Fusarium moniliforme* [*Gibberella fujikuroi*], but ethyl mercuric phosphate had some inhibitory effect.

Naim (M. S.) & Hussein (A. M.). **Growth responses of Fusarium oxysporum to metabolites of some rhizospheric microflora of Egyptian Cotton varieties.**—*Nature, Lond.*, **181**, 4608, p. 578, 1958.

Of the rhizospheres of different cotton varieties examined at A'in Shams University, Abbassia, Cairo, that of Ashmouni, a var. resistant to *F. oxysporum* [**36**, p. 761] wilt, had the highest populations of *Bacillus subtilis*, while that of the susceptible Giza 26 had the highest numbers of *B. megaterium*. *B. subtilis* was highly antagonistic to *F. oxysporum* in culture, while *B. megaterium* stimulated mycelial production. Germination of microconidia and mycelial growth were considerably suppressed by 5- or 10-day-old culture filtrates of *B. subtilis*; ageing of the culture and heating of the filtrate did not appreciably alter the effect.

A factor promoting microconidial germination and mycelial growth, present in filtrates of *B. megaterium*, was unaffected by heating, though ageing of the culture increased stimulation of growth.

It is concluded that the inhibitory anti-fungal metabolites of *B. subtilis* are probably of the nature of an antibiotic, while the stimulatory factor of *B. megaterium* is probably a growth factor.

Todorova (Mme V.). Полиспороза по Лена. [Polysporiosis of Flax.]—Бюл. Раст. Защ. [*Bull. Plant Prot., Sofia*], **3** (*1954*), 2, pp. 55–57, 1955. [Received Mar. 1958.]

In the Samokov district, Bulgaria, flax was severely affected in 1954 by *Polyspora lini* [map 88]. The most resistant variety proved to be Pobeditel from U.S.S.R. Seed disinfection is advocated.

Christova (Mme E.). Кафяво гниене на луковиците при Нарцисите. [Brown rot on Narcissus bulbs.]—Бюл. Раст. Защ. [*Bull. Plant Prot., Sofia*], **3** (*1954*), 2, pp. 48–51, 1955. [Received Mar. 1958].

In the Sofia district of Bulgaria brown rot (*Fusarium bulbigenum*) of narcissus bulbs has been severe under conditions of damp and warm storage. The most susceptible vars. are King Alfred, Peaster, and Geranium; Emperor, Victoria, and Althea being moderately resistant [cf. **30**, p. 160]. Soaking for 1 hr. in 1:150 formalin gave good control, but 1:1,000 $HgCl_2$, though effective, damaged the bulbs.

Schmidt (Trude). **Xanthomonas pelargonii — der Erreger einer Pelargonienblattfleckenkrankheit.** [*Xanthomonas pelargonii*, the cause of a leaf spot disease in *Pelargonium*.]—*Pflanzenarzt*, **11**, 1, p. 21, 1 fig., 1958.

A brief description of the disease and its control [cf. **34**, p. 210].

Jung (J.) & Stoll (C.). **Über die Hemmwirkung des Gynäzeums bei Primula obconica auf Bakteria und Pilze. I. Über Schwankungen der Hemm-Intensität.** [On the inhibitory effect of the gynaecium of *Primula obconia* on bac-

teria and fungi. I. On variations of the inhibitory intensity.]—*Phytopath. Z.*, **31**, 2, pp. 180–184, 1 graph, 1957.

At the Institut für spezielle Botanik, Eidgenössische Technische Hochschule, Zürich, Switzerland, *Bacillus subtilis* and *Aspergillus luchuensis* were used in the agar diffusion test to investigate flower organs of blue and red varieties of *P. obconica* at different stages of development.

The inhibitory activity was greatest in unopened flowers. Before pollination a slight, and after pollination a distinct decrease occurs. In fertilized flowers there is no longer any sign of inhibition, which decreases with advancing age in unpollinated flowers. It varies between different plants of one variety. The inhibitory substance is not restricted to the stigma and style but also occurs in the ovary. Infected flowers show an increased post-infection resistance.

Treggi (G.). **Un forte attacco di Botrytis tulipae Lind. a colture di Tulipano.** [A severe attack by *Botrytis tulipae* Lind. on Tulip plantings.]—*Agricoltura ital.*, **57** (N.S. **12**), pp. 177–184, 3 fig., 1957. [French summary.]

In 1957, at Versilia, Italy, large commercial plantings of tulips were very severely attacked by *B. tulipae* [map 170] and heavy losses sustained.

Kotte (W.). **Krankheiten und Schädlinge im Obstbau und ihre Bekämpfung. Dritte Auflage.** [Diseases and pests in fruit cultivation and their control. Third edition.]—xvi+519 pp., 8 col. pl., 232 fig., Berlin, Paul Parey, 1958. DM 54.

This edition follows the same lines as its forerunner [**28**, p. 220], but with the omission of the determinative keys for pests and diseases. The various sections have been expanded to cover recent work and the bibliography (1,380 refs.) is brought up to date.

Králiková (Katarína). **Problematika vírusových chorob ovocných drevín v Bulharsku.** [Problems of virus diseases on fruit trees in Bulgaria.]—*Pol'nohospodárstvo*, **3**, 6, pp. 815–823, 1956. [Russian and German summaries. Abs. from *Referat. Zh. Biol.*, *1957*, 23, p. 141, 1957.]

Descriptions are given of the plum diseases caused by *Prunus* virus 7 (plum pox virus) and 6a; *Prunus* virus 6b causing a ring spot of cherries; *Prunus* virus 8 on apricot (a yellow mosaic); *Prunus* virus 9 [cherry rough bark virus] on peach; a white mosaic of *Prunus cerasifera*; *Pyrus* virus 1 [mountain ash infectious variegation virus] on pear; and on apple, the *Pyrus* viruses 2 [apple mosaic virus], 4, and 5 (a ring spot). Control measures are indicated.

Vukovits (G.). **Rostpilze im Obstbau.** [Rust fungi in fruit cultivation.]—*Pflanzenarzt*, **11**, 1, pp. 13–16, 6 fig., 1958.

This is a general article concerning the following rusts of fruit [in Austria]: *Gymnosporangium sabinae* on pear and *G. mali-tremelloides* [*G. tremelloides*] on apple [**29**, p. 404]; *Cronartium ribicola* [**36**, p. 146] and *Puccinia ribesii-caricis* [*P. pringsheimiana*: **10**, p. 624] on currants; *Tranzschelia pruni-spinosae* [**33**, p. 589] on prune-plum; *Phragmidium violaceum* on blackberry; and *P. rubi-idaei* [**20**, p. 596] on raspberry.

Boone (D. M.), Kline (D. M.), & Keitt (G. W.). **Venturia inaequalis (Cke) Wint. XIII. Pathogenicity of induced biochemical mutants.**

Kline (D. M.), Boone (D. M.), & Keitt (G. W.). **XIV. Nutritional control of pathogenicity of certain induced biochemical mutants.**—*Amer. J. Bot.*, **44**, 9, pp. 791–796; pp. 797–803, 7 fig., 1957.

These papers cover further studies at the University of Wisconsin [**36**, p. 767] in which 107 induced biochemical mutants of *V. inaequalis* were tested for patho-

genicity by conidial atomization on leaves of apple (7 vars., 1–2 yr. old). Those requiring biotin, inositol, nicotinic acid, pantothenic acid, or reduced sulphur were pathogenic, while those requiring choline, riboflavin, purines, pyrimidines, arginine, histidine, methionine, or proline were not. That the losses in pathogenicity were due solely to nutritional deficiencies was indicated by (1) the association between auxotrophy and loss of pathogenicity; (2) the parallelism between loss of pathogenicity and nutritional deficiencies; and (3) the finding that from crosses between non-pathogenic mutants and the wild type all mutant progeny were non-pathogenic while all wild type progeny were pathogenic.

In the 2nd study 6 out of 8 non-pathogenic mutants (requiring, respectively, choline, riboflavin, pyrimidines, arginine, histidine, and methionine) became pathogenic in a greater or lesser degree when the substances for which they were deficient were applied to the surface of inoculated apple leaves during the incubation period.

These mutants were able to penetrate the cuticle and establish themselves in the typical subcuticular position unaided, but the extent of their further development varied directly with the amount of supplement provided. The mutants requiring choline or histidine also responded when these substances were introduced *via* the vascular system. Growth responses to apple leaf sap by 11 biochemical mutants, some of which were pathogenic to unsupplemented leaves, indicated that with the possible exception of histidine the required substances were present in the leaves. It was concluded that some of the substances, though present in the leaves, are not available in sufficient quantity at the site of infection to support a substantial growth of the mutants.

Reich (H.). **Gezielte Schädlingsbekämpfung. Ein Erfolg von Beratung und Warnungsdienst im Alten Lande.** [Purposive pest control. A result of the advisory and warning service in the Alte Land.]—*Umschau*, **57**, 17, pp. 513–515, 1 fig., 1 graph, 1957.

In connexion with the 4th International Plant Protection Congress, held at Hamburg in Sept. 1957, the author presents up-to-date information on the methods used against apple pests and scab [*Venturia inaequalis*] at the Obstbauversuchsanstalt Jork [**34**, p. 574] in the 'Alte Land', a fruit-growing district on the left bank of the Elbe between Hamburg and Stade.

Stoll (K.). **Über den Einfluß von Fungiziden auf die Qualität und das Lagerungsverhalten von Äpfeln.** [On the influence of fungicides on the quality of Apples and on their behaviour in storage.]—*Schweiz. Z. Obst-u. Weinb.*, **67**, 2, pp. 36–40, 2 fig.; 4, pp. 120–124, 1 fig., 1958.

At the Eidg. Versuchsanstalt, Wädenswil, the author compared a number of fungicides in respect of the incidence of scab [*Venturia inaequalis*], *Gloeosporium* rot, and several physiological conditions (including superficial cork formation, red spotting, and poor flavour) in stored apples from 1953–57. He concludes, *inter alia*, that Cu is effective against the 2 fungal diseases but is not tolerated by some varieties; captan is effective against *Gloeosporium* but unreliable for scab; and zineb is effective against scab in most cases.

Zanardi (D.). **Il 'mosaico' del Pero in Provincia di Pavía.** [Mosaic of Pear in the province of Pavia.]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 57–64, 2 pl., 1957. [English summary.]

Investigations of a condition affecting pear trees of different varieties growing in the province of Pavia, Italy, showed it to be typical pear mosaic virus disease [cf. **36**, p. 330], the characteristic symptoms corresponding to those described for 'ring pattern mosaic' [**35**, p. 831]. The pear vars. observed fell into 3 categories:

Spadona d'inverno, Kaiser, and Armela, showing small, numerous rings as the prevalent symptom; Madernassa and Martinone, showing a chlorotic elongated pattern, which often covers large areas of the leaf blade; and Giassolo, Curato, and Cavalleri, with both types of symptom present on the same leaf.

Zanardi (D.). **Attachi di 'ruggine' su frutti di Pero della cultivar 'Curato' in provincia di Pavia.** [Attacks of 'rust' on Pear fruits of the cultivar Curato in the province of Pavia.] —*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 7–11, 1 pl., 2 figs., 1957. [English summary.]

In 1956, 2 Curato pear trees growing among several other varieties near Pavia, Italy, were attacked by a rust, thought to be *Gymnosporangium clavariiforme* [**4**, p. 711]. Infection was confined to the fruits. The rust was also present on *Crataegus oxyacantha* growing in the vicinity, and the teleutospore stage was found on *Juniperus communis* nearby.

Zanardi (D.). **Azione tossica su alcune cultivar di Pero da parte dello 'zineb'.** [The toxic effect of zineb on some Pear cultivars.]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 51–56, 1 pl., 1957. [English summary.]

Reports of damage to pear trees by zineb having been received at the University of Pavia from various parts of Italy in 1954–56, field and laboratory spraying tests were carried out on 22 vars. Of these, only Spadona d'estate and Armela showed any ill effect from a single application at 0·3%; this took the form of a conspicuous discoloration of the under surface of the leaves and on the young fruits. The remaining varieties (all more important, commercially) were not affected even by 3 sprays at 0·8%. The evidence obtained showed that in both the sensitive varieties the cuticle of the under surface of the leaves was thin or almost lacking.

Ehlers (C. G.). **Separation and identification of viruses that incite diseases of stone fruits.**—*Diss Abstr.*, **17**, 9, pp. 1879–1880, 1957.

At the University of Wisconsin dormant budsticks of Horseshoe Bay 15-7, a source of sour cherry necrotic ring spot [peach ring spot], prune dwarf, and (sour) cherry yellows viruses [**37**, p. 91], were given warm water treatment before inoculation [? budding] to sour cherry and Italian prune. Both (sour) cherry yellows and peach ring spot viruses were inactivated by 36 hr. at 35° C. but not by 35 min. at 50°, indicating that the latter may be a component of the (sour) cherry yellows complex; prune dwarf virus was inactivated after 22 min. at 50° and 30 hr. at 35°.

Symptoms of peach ring spot, (sour) cherry yellows, and prune dwarf did not develop on Montmorency cherry and Italian prune inoculated with buds from dormant budsticks which had been soaked for 1 hr. in substituted purine and pyrimidine compounds. When 302 seedlings from seed taken from experimentally infected Italian prune trees were examined for infection by inoculation into differential hosts comprising guar, *Sesbania* [cf. **36**, p. 599], water-melon, and tobacco, viruses A, B, and E [**37**, p. 293] were not recovered; necrotic spotting of *Sesbania* indicated the presence of a virus, probably peach ring spot, in 37% of the seedlings; 6 guar plants developed symptoms of virus A or virus G; none of the seedlings exhibited prune dwarf symptoms.

Baumann (Gisela). **Über eine durch ektoparasitische Gallmilben verursachte Gelbfleckigkeit (Sternfleckenkrankheit) bei Prunus-Arten.** [Concerning a yellow spotting ('star spot' disease) caused by ectoparasitic gall mites on *Prunus* spp.] —*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **11**, 12, pp. 246–250, 7 fig., 1957.

From the Institut für Phytopathologie, Aschersleben, the author describes the 'star spot' disease of *Prunus* spp. [cf. **30**, p. 171]. The symptoms were reproduced in healthy trees when eriophyid mites were allowed to feed on the foliage, and the negative results with grafting experiments indicated that no virus was involved.

Grosclaude (C.). **Production d'enzymes pectiques adaptatives et de polyphénol-oxydase par le Stereum purpureum Pers.** [Production of adaptative pectic enzymes and of polyphenoloxidase by *Stereum purpureum* Pers.]—*C. R. Acad. Sci., Paris*, **246**, 8, pp. 1273–1274, 1958.

Stereum purpureum, the cause of silver leaf of fruit trees, was shown to be capable of secreting pectin-esterase and polygalacturonase as well as polyphenol oxidase [cf. **4**, p. 757].

Zanardi (D.). **Su una Diaportacea del Pesco nell' Italia settentrionale. (Nota preliminare).** [On a diaporthiaceous species on Peach in northern Italy. (Preliminary note).]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 3–6, 1957. [English summary.]

In 1957, after a very cold spring, many peach orchards in the Po Valley, Italy, were attacked by a diaporthiaceous fungus, which caused bark-cracking and the production of water-soaked spots on the leaves. From a review of the literature the author concludes that if the fungus be regarded as biologically different from the similar pathogen found on apple trees it may be referred to *Fusicoccum amygdali* [cf. **36**, p. 411]; otherwise, it may be considered to be *Phomopsis mali* (*Diaporthe perniciosa*) [cf. **30**, p. 616]. Further studies are in progress.

Kovachevski (I.). Съчмянка по Бадема **(Cercospora circumscissa Sacc.).** [Disease on Almond (*Cercospora circumscissa* Sacc.).]—Бюл. Раст. Защ. [*Bull. Plant Prot., Sofia*], **3** (*1954*), 2, pp. 44–46, 1 fig., 1955. [Received Mar. 1958.]

In 1954 in N.E. Bulgaria, a severe leaf spot disease causing premature defoliation of almond and at first attributed to *Clasterosporium carpophilum* proved in fact to be due to *Cercospora circumscissa*, not recorded in Bulgaria since 1 case was observed in 1935 [cf. **16**, p. 493]. Black blotch (*Polystigma ochraceum*) [*P. fulvum*: cf. **36**, p. 6] of almond trees was also prevalent, due to the wet spring.

Domes (R.). **Eine Abbauerscheinung bei der Erdbeersorte Madame Moutot.** [Degeneration effects in the Strawberry variety Madame Moutot.]—*Phytopath. Z.*, **31**, 2, pp. 113–122, 4 fig., 1957.

Dwarfing in Madame Moutot strawberry plants, widespread in the Schorndorf district, near Würtemberg, Germany, during 1953–55, was accompanied by small crinkled leaves, a severe setback of flower and fruit set and runner development, and often ended with complete dying off.

Two viruses were detected. One had minimal acquisition and transmission feeding periods of 1 hr., persistence of 3–5 hr. in *Passerinia* [*Pentatrichopus*] *fragaefolii*, and an incubation period of 9–15 days in the plant (*Fragaria vesca* and the var. Regina) where it produced veinclearing on the dwarfed, asymmetrical leaves with irregular margins. The first main symptom was similar to that of the strawberry veinbanding virus [**35**, p. 29], but it is certainly related to strawberry virus 1 of Prentice [strawberry mottle virus: **32**, p. 573].

The other virus, which persists in *P. fragaefolii* for several days, had an incubation period of 60 days, and caused dwarfing of *F. vesca* similar to that produced by strawberry stunt virus [**32**, p. 323].

Chanturya (N. N.) & Kakulya (M. A.). Испытание некоторых препаратов для протравливания семян Шелковицы. [Trials with some compounds for dusting of Mulberry seeds.]—Тр. ин-та защиты раст. АН Груз.С.С.Р. [*Trud. Inst. Zashch. rast. Acad. Sci. Gruz. S.S.R.*], **11**, pp. 9–19, 1956. [Abs. from *Referat. Zh. Biol., 1957*, 19, pp. 177–178, 1957.]

During a wet spring in Georgia a rapid rotting of young mulberry seedlings caused up to 25–30% loss, the fungi responsible being mainly *Fusarium* sp. and *Botrytis*

cinerea. Seed treatment with NIUIF [**36**, pp. 462, 539] or thiram gave good control, the latter being recommended as it is not dangerous to animals and proved more efficient.

Christov (A.). Болести по Нара **(Punica granatum)** в България. [Diseases on Pomegranates (*Punica granatum*) in Bulgaria.]—Бюл. Раст. Защ. [*Bull. Plant Prot., Sofia*], **3** (*1954*), 2, pp. 65–66, 1955. [Received Mar. 1958.]

In Bulgaria 2 diseases of pomegranates are of economic importance, blotches caused by *Cercospora* (*Mycosphaerella*) *lythracearum* [cf. **7**, p. 186] and dry rot caused by *Zythia* (*Nectriella*) *versoniana* [cf. **10**, p. 774; **14**, p. 778]. The var. Kushutze is very resistant to the dry rot; spraying with 1% Bordeaux mixture checked this disease.

Teakle (D. S.). **Papaw root rot caused by Phytophthora palmivora Butl.**—*Qd. agric. J.*, **14**, 2, pp. 81–91, 4 fig., 1957.

A root rot of papaw, with symptoms similar to those described by Wager in S. Africa [**11**, p. 330], has become increasingly prevalent since 1955 in Queensland, where the disease in the past has generally been attributed to *Pythium* spp. [cf. **23**, p. 448]. In the present study *Phytophthora palmivora* was isolated in association with *Pythium vexans* and was shown by inoculation tests to be the parasite. Waterlogging is a predisposing factor, and soil temps., except in June–Aug. when they are below 18° C., and possibly also in May and Sept., are high enough to favour growth and sporulation of the fungus. Root damage, as by wind, aids infection, to which younger plants are more subject than older ones. A partial remedy for the disease lies in crop rotation.

The parasite proved able to rot wounded green papaw fruit under artificial conditions, but has not been observed to do so naturally [cf. **35**, p. 170].

Protsenko (E. P.). Новый случай совместного заражения злака грибом и нематодой. [New case of joint infection of grasses by fungi and nematodes.]—Бюлл. Бот. Сада. [*Bull. Bot. Gdn, Moscow*], **29**, pp. 91–93, 5 fig., 1957.

In the Botanical Gardens, Moscow, in 1955, the infected parts of *Agrostis tenuis* attacked by *Dilophospora alopecuri* were invaded by a large number of nematodes (*Anguina* [*Anguillulina*] sp.) [cf. **35**, p. 361], which spread the fungal spores. *D. alopecuri* was inoculated to *Alopecurus pratensis*, and has been observed in the field on *A. agrostis* [*A. myosuroides*], *Calamagrostis epigejos*, *Phleum pratense*, *Avena elatior*, *Holcus lanatus*, *H. mollis*, *Agrostis spica-venti*, and *Bromus erectus*, and in some districts on wheat, rye, and oats. It is believed that the fungus was transmitted from wild grasses to those cereals by nematodes.

Koshimizu (Y.) & Iizuka (N.). **Origins and formation of intracellular inclusions associated with two leguminous virus diseases.**—*Protoplasma*, **48**, 1, pp. 113–133, 32 fig., 1957. [37 refs.]

At the Tohoku National Agricultural Experiment Station, Higashianiwa, Morioka, Japan, 1 of the 2 hitherto undescribed viruses isolated from naturally infected white clover plants induced both cytoplasmic and intranuclear inclusions, while the other resulted in the development of a new type of cytoplasmic inclusion, herein designated 'corner inclusion bodies'. All 3 kinds of inclusion were detected in the same cells. The results of staining and cytochemical tests indicated that the 2 types of cytoplasmic inclusion originated mainly in the plastids, while the intranuclear bodies arose from the nucleoli. The cytoplasmic inclusions were found to contain protein and ribonucleic acid.

These findings form the basis of a discussion on the possibility of virus synthesis in plastids and nucleoli. The viruses occur almost invariably as a complex but are separable because broad bean is susceptible to only one, while *Myzus persicae* transmits only the other.

Riceman (D. S.) & Jones (G. B.). **Distribution of zinc and copper in Subterranean Clover (Trifolium subterraneum L.) grown in culture solutions with graduated amounts of zinc.**—*Aust. J. agric. Res.*, **9**, 1, pp. 73–122, 1 pl., 45 graphs, 1958. [36 refs.]

This detailed and comprehensive study from the University of Adelaide deals with basic factors concerning Zn and Cu in the tissues of subterranean clover [cf. **35**, pp. 300, 894] and their relation to the symptoms induced by Zn deficiency. No symptoms developed when the concentration of Zn in the whole plant exceeded 15 p.p.m. dry matter. In the healthy plants the concentration in young leaves and petioles was 19 p.p.m. or more; in the affected less than 10 p.p.m.

Bancroft (J. B.) & Kaesberg (P.). **Size and shape of Alfalfa mosaic virus.**—*Nature, Lond.*, **181**, 4610, pp. 720–721, 1 fig., 1 graph, 1958.

In studies at Purdue University, Lafayette, Indiana and the University of Wisconsin, Madison, 3 kinds of macromolecular particles were identified in preparations from tobacco of an isolate of lucerne mosaic virus originally obtained from ladino clover, and the electron microscope (combined with local lesion assays on *Phaseolus vulgaris*) showed the virus particles to be short rods 200 A diam. and 550 A long.

Hawn (E. J.). **Studies on the epidemiology of crown bud rot of Alfalfa in Southern Alberta.**—*Canad. J. Bot.*, **36**, 2, pp. 239–250, 2 pl., 3 graphs, 1958. [23 refs.]

The substance of this paper on the disease of lucerne associated with a succession of fungi has already been noticed [**37**, p. 101].

Kiessig (R.) & Haller-Kiessig (Renate). **Beitrag zur Kenntnis einer infektiösen Welkekrankheit der Luzerne (Verticillium albo-atrum R. et B.).** [Contribution to the knowledge of an infectious wilt disease of Lucerne (*Verticillium albo-atrum* R. et B.).]—*Phytopath. Z.*, **31**, 2, pp. 185–222, 6 fig., 1957. [72 refs.]

A comparison of the symptoms of arid wilt ('Dürrewelke': K. Naumann, Studien über eine Welkekrankheit der Luzerne. Unpublished.) with those of the 3 known wilt diseases of lucerne at the Institut für allgemeine Botanik, Friedrich Schiller University, Jena, Germany, showed that there was considerable agreement between it and *Fusarium* wilt (*Fusarium* sp.) and with *Verticillium* [**36**, p. 530] wilt. Each of these diseases produces a number of symptoms which are similar for all three, whereas the root symptoms of arid wilt are quite different from those produced by an infection with *Corynebacterium insidiosum*.

The cause of the polymorphous expression of each of the described diseases may be attributed to the varying degrees of infection, and to the variations in the water relations and physiological potentiality of the plants.

The root symptoms of arid wilt (a red-brown discoloration of the stele) are indistinguishable from those of the *Fusarium* and *Verticillium* wilts. However, numerous isolation and infection tests proved that *V. albo-atrum* is the pathogen. Reisolation was secured from 50–90% of the artificially and naturally infected plants: from heavily infected plants it was usually 70% and from plants with less developed symptoms 11%. One strain (III) isolated, *Verticillium* sp., differed from *V. albo-atrum* in producing a deep yellow colour on the culture medium and in having smaller but numerous verticils. The lucerne plants infected with this strain did not show any disease symptoms after 9 weeks. Though most of the roots showed no discoloration yet it was possible to re-isolate this strain from 50% of the plants. It is astonishing that with such a high percentage of successful infections plants were symptomless. One could attribute this to the extreme weather conditions at the time of the experiments, but probably something special was involved.

Four strains of *V. albo-atrum* produced 2 toxins with different effects and properties. One, which is produced in increasing quantities with increasing age of

culture, is thermolabile and causes necrosis of the leaf blades. The other is thermostable and induces a general wilt: its production was greatest at the time of the max. growth of the plant. Substances which were phytotoxic to tomato were extracted with water from fungal cultures on wheat bran.

Van Steveninck (R. F. M.). **Influence of Pea-mosaic virus on the reproductive capacity of yellow Lupine.**—*Bot. Gaz.*, **119**, 2, pp. 63–70, 3 fig., 3 graphs, 1957.

In experiments at the Crop Research Division, Christchurch, New Zealand, yellow lupin (*Lupinus luteus*) plants inoculated with common pea mosaic virus [**23**, p. 301] by means of *Myzus persicae* were either almost sterile and exhibited continuous growth, or there was highly stimulated pod-setting with no continuous growth. Apart from a slight varietal difference in reaction to the virus between the vars. Weiko III on the one hand, and Weiko II and New Zealand Sweet Yellow on the other, there was no genetic difference in reaction. Infection before the appearance of the main inflorescence caused the production of more flowers/inflorescence, but they were usually sterile, and growth was continued by the development of lateral shoots. Plants infected after the inflorescences appeared produced almost double the normal number of pods and seeds on the main inflorescence.

The growth of pods on infected plants was limited in longitudinal and median directions, but they contained almost as many seeds as those on healthy plants, though the seeds were only 40% of normal size. Seed shape and weight relative to the pods indicated that the virus limited seed size through limitation of pod size. The symptoms described indicated that the virus was affecting the auxin metabolism.

Braun (H.). **Die wichtigsten Krankheiten der Kartoffelknollen.** [The most important diseases of Potato tubers.]—49 pp., 64 fig., 2 graphs, Berlin and Hamburg, Paul Parey, 1958.

This is the 3rd edition of a work which formerly appeared under the title 'Erkennung, Bedeutung, und Bekämpfung der hauptsächlichsten Kartoffelknollen-Krankheiten' (Hildesheim, Thomas Mann, 1952, 1953).

There are sections on parasitic diseases (pp. 9–29), non-parasitic conditions (pp. 31–43), and wound cork formation (pp. 43–48).

Bourke (P. M. A.). **Agricultural meteorology.**—iv+90 pp., 6 diag., 4 graphs, 1 chart, New York, United Nations Report No. TAA/CH1/2, 1956. [Received Mar. 1958.]

This report [cf. **36**, p. 550; **37**, p. 303] deals with the relation between potato blight (*Phytophthora infestans*) and weather conditions in Chile.

Turner (P. B.). **The effect of calcium-potassium ratios on the incidence of Potato scab.**—*Diss. Abstr.*, **17**, 7, pp. 1441–1442, 1957.

At Michigan State University a field trial was conducted to determine whether Zn would reduce potato scab [*Streptomyces scabies*: cf. **36**, pp. 52, 266, 347]. The trial was on a limed Hillsdale sandy loam with a pH value originally of 6·2 and an exchangeable Ca-K content of 3·5:0·8 milliequivalents/100 g. K was applied at 0–450 lb./acre in 50 lb. increments and Zn at 0, 12·5, and 25 lb.

In 1951, when the Ca-K ratio approached unity, Katahdin potatoes gave increased yields and were less affected by scab. The 1952 data, however, did not confirm this trend. In 1953 the yields, percentage scab, and scab index showed that Chippewa and Sebago did not respond favourably to K, though Katahdin had a reduced scab index and increased yields, but of less magnitude than in 1951. Zn had no effect on scab or yield.

In a greenhouse experiment with Emmet fine sandy loam of pH 6·5 and 5% organic matter, lime in bands at 9 in. depth did not reduce scab or increase yield

of Chippewa potatoes at either of 2 pH levels but tubers at pH 5·6 with 1,000 lb. lime/acre mixed throughout the top 9 in. were the most free from scab and the largest harvested.

Azakawa (T.) & Uritani (I.). **Respiratory increase and phosphorus and nitrogen metabolism in Sweet Potato infected with Ceratostomella fimbriata. (Part 20.)**

Azakawa (T.). **Metabolic activation of White Potato tissue infected with Ceratostomella fimbriata (Part 21.) Nature of protein synthesis in Sweet Potato tissue infected with Ceratostomella fimbriata. (Part 22.)**—*J. Biochem., Tokyo*, **43**, 5, pp. 579–587, 2 graphs; pp. 589–595, 3 graphs; pp. 597–602, 1 graph, 1956. [Received 1957.]

Azakawa (T.), Umemura (Y.), & Uritani (I.). **Electrophoretic study of protein metabolism in Sweet Potato infected with Ceratostomella fimbriata.**—*Bull. agric. Chem. Soc. Japan*, **21**, 3, pp. 192–196, 1 diag., 1 graph, 1957.

The 1st paper is a reprint in English of one already noticed [**35**, p. 710]. The 3rd has been noticed in a shorter form [**35**, p. 789].

In sound tissue of potato tubers adjacent to tissue inoculated with *C.* [*Ceratocystis*] *fimbriata* [cf. **36**, pp. 548, 549], to which potatoes are normally highly resistant, an increase in respiration and organic phosphate occurred, and a decrease in inorganic phosphate, but these changes were less extensive than in sweet potato. However, the increase in insoluble N (protein) compensating the decrease in soluble N (amino-acids and amides) reached the same level as in the sweet potato.

A strain of *C. fimbriata* from *Syngonium auritum*, though infecting sweet potato only rarely, attacked potato more severely than the normal strain and caused a greater respiratory increase. This increase appears to parallel the depth of penetration of the fungus

The 4th paper describes an electrophoretic analysis of the protein components [**35**, p. 227] in sound tissue of sweet potato adjacent to infected tissue. The pattern was different from that in healthy tubers.

Annual Reports of the Sugarcane Breeding Institute, Coimbatore, for 1953–54 & 1954–55. 112 pp.; 90 pp., 1 graph [? 1957]. 5*s.* 8*d.*; 3*s.* 1*d.* [Received 1958.]

In the section on diseases (pp. 34–43) in the 1953–4 report by the director, N. L. Dutt [cf. **33**, p. 562], the sugar-cane vars. Co. 1002, 1006, 1011, and 1026 are listed as resistant to red rot (*Physalospora* [*Glomerella*] *tucumanensis*) and as developing no infection by smut (*Ustilago scitaminea*) [**35**, p. 279] during inoculation tests at Coimbatore, India. *U. scitaminea* from sugar-cane was also able to attack a few *Saccharum spontaneum* vars.; most, however, developed no infection on inoculation, including SES 137A, 197B, and 210, which were also immune from red rot. Moulds developing on sugarcane setts packed in alkathene film included *Aspergillus* and *Penicillium* spp., *Rhizopus nigricans* [*R. stolonifer*], and *Ceratostomella* [*Ceratocystis*] *paradoxa*, the last 2 causing rotting of the setts and their failure to germinate. During 1954–5 the value of 0·1% mercuric chloride for sterilizing both setts and film was confirmed, the setts remaining healthy up to 2 months after packing.

In the 1954–5 report, in the section on the Spontaneum Expedition Scheme (pp. 32–43), it is recorded that the *S. spontaneum* vars. SES 100A, 113A, 205A, 205B, and 231 have shown resistance to red rot in all 3 years of testing.

The mycologist, K. V. Srinivasan, records (pp. 66–76) moderate resistance to red rot in some seedlings from crosses of sugarcane with the moderately resistant *Narenga porphyrocoma* and *Sclerostachya fusca*.

The uredial state of a rust similar to *Puccinia kuehnii* [**37**, p. 111] was observed on Co. 928 sugarcane at Nellikuppam and on some *Saccharum spontaneum* vars. A rust affecting 9 *Erianthus arundinaceus* [*S. arundinaceum*] vars. agreed closely with *Uredo ravennae*.

Top rot was observed on many sugarcane vars. at Taliparamba following the monsoon rains. The symptoms varied from a slight chlorosis to severe rotting of the spindle and malformation of the leaves. Most of the varieties recovered. Isolates from affected material resembled *Gibberella fujikuroi*. Following floods many vars. developed zonate leaf and sheath spot associated with a *Rhizoctonia* sp. producing coffee-coloured sclerotia. To control the disease the lower leaves of the plants were stripped. A mid-rib blotch was observed on several *S. spontaneum* vars., including those from Uganda. Pycnidia of a *Phyllosticta* were found on the spots and the fungus was isolated in culture.

Chenery (E. M.). **Boron deficiency in Tea.**—*Nature, Lond.*, **181**, 4606, p. 426, 1958.

At the Kawanda Research Station, Kampala, Uganda, a B deficiency symptom in tea first appeared in a pot experiment devised to test soils for natural K uptake. All the plants in 2 soils, known to be deficient in B, when about 30 cm. tall, died at the growing point and developed corky excrescences on the under side of the petiole. Growth in a nutrient solution with and without B was rapid, but in the latter the petioles of new shoots and later the laminae developed brown spots which enlarged and spread along most of the petioles, midribs, and stems with marked suberization. The affected leaves were wrinkled and contorted. Those reaching maturity before the deficiency became acute bore suberized cracks on the main veins. The condition has not yet been seen in the field.

Lucas (G. B.). **Diseases of Tobacco.**—viii+498 pp., 152 fig., 2 diag., 1 graph, New York, The Scarecrow Press, Inc., 1958. [Multigraphed.] $10.00.

This comprehensive publication from N. Carolina State College reviews basic knowledge on the subject, with emphasis on disease problems in the U.S.A., and should be of use in teaching and research as well as farming. A general section that deals with plant bed management and rotation as related to disease control, and with breeding for resistance, is followed by sections covering diseases caused by nematodes, fungi, bacteria, viruses, flowering plants, malnutrition, and miscellaneous disorders. Each section terminates with a relevant bibliography, most of which is reviewed in the text.

Berger (P.) & Kiewnick (L.). **Der Einfluß der Stickstoff- und Phosphorsäuredüngung auf die Konzentration verschiedener Viren im Tabakblatt. I. Mitteilung. Die Veränderungen der Konzentration des TMV.** [The influence of nitrogen and phosphoric acid manuring on the concentration of various viruses in the Tobacco leaf. Note I. Changes in the concentration of TMV.]—*Ber. Inst. Tabakforsch. Dresden*, **4**, 1, pp. 70–80, 1957. [Russian and English summaries.]

A tabulated survey is presented of experiments at the Institut für Tabakforschung, Dresden, in 1956–7, the results of which demonstrated that increased N (as lime-ammonium nitrate) up to 3,971 g./pot (180 kg./ha) was generally accompanied by a corresponding rise in the concentration of tobacco mosaic virus in the foliage of the Wohlsdorfer Burley and Havana IIc vars. [cf. **33**, p. 690]. The influence of superphosphate was less pronounced, but at dosages equivalent to 55 and 110 kg./ha. it tended to reduce the concentration of the virus.

Hirai (T.), Shimomura (T.), & Nishikawa (Y.). **Effect of thiosemicarbazones on the multiplication of Tobacco mosaic virus.**—*Nature, Lond.*, **181**, 4605, pp. 352–353, 1958.

In experiments at Nagoya University, Anzyo, Japan, detached leaves of Turkish tobacco were inoculated by rubbing and kept in an incubator for 24 hr. at 25° [C.], suspended on water. Then half-leaves or leaf disks cut from the inoculated

leaf were floated on aqueous solutions of the test compounds under daylight fluorescent lamps with opposite half-leaves or other disks on water. After 6 days' incubation the leaf tissues were homogenized. The compound most effective in producing inhibition was benzalacetone thiosemicarbazone (10–50 μg./ml.), as indicated by analysis with ammonium sulphate or with trichloroacetic acid.

ROLAND (G.). **Sur un virus necrosant pour le Tabac.** [On a virus causing necrosis of Tobacco.]—*Parasitica*, **13**, 4, pp. 135–143, 2 pp., 1957.

From a potted Samsun tobacco plant grown in unsterilized soil which had borne a crop of tomatoes affected by corky root disease [**37**, p. 250] the author isolated a virus which inoculated into cucumber, *Trigonella coerulea*, *Datura stramonium*, and *Plantago major* caused necrosis of the inoculated leaves only; was systemic in Samsun tobacco, *Nicotiana glutinosa*, *Zinnia elegans*, celery, spinach, *Solanum nigrum*, Bintje and Ackersegen potatoes, aster, petunia, and Saxa beans (*Phaseolus vulgaris*); and caused latent infection in lettuce and *Primula obconica*. In Marmande tomato it was either latent or systemic, sometimes causing root lesions but not the more severe symptoms of corky root.

The virus was inactivated at 75–85° C., transmitted through the soil and by the sap of infected plants, and had sub-spherical particles. Intense artificial lighting appeared to eliminate it from affected tobacco plants, though susceptibility of Saxa bean was increased. The virus is considered to belong to the tobacco necrosis group [**37**, p. 245] and is named *Nicotiana* virus 11 var. Broeckhoven.

IVANCHEVA-GABROVSKA (T.). Нова вирусна болест у нас—пръстеновидна некроза по Тютюна. [New virus disease in our country—ring-like necrosis on Tobacco.]—Бюл. Раст. Защ. [*Bull. Plant Prot., Sofia*], **3** (*1954*), 2, pp. 19–26, 1 fig., 1955. [Received Mar. 1958.]

In 1952–54 a virus disease appeared in 50–100% of the tobacco fields in the Gotse Delchev district in Bulgaria and in 1952 caused the loss of 200 tons of dry tobacco leaves. Small, ring-like spots, which dry and become brown within a few days, appear on the stems, producing severe necrosis. *Thrips tabaci* was shown to be the vector; the incubation period is 8–12 days. The same virus also attacks mahorka tobacco, *Nicotiana glutinosa*, tomato, and [*Datura*] *stramonium*.

Deep ploughing and incorporation of 3 kg. of 12% hexachloran/ha. in the soil decreased the thrips population by as much as 80% and spraying also with parathion at 30 g./100 l. was effective.

SCHMELZER (K.) & KLINKOWSKI (M.). **Ein neuer Stamm des Tabakrippenbräunevirus in Mitteldeutschland.** [A new strain of the Tobacco vein-browning virus in central Germany.]—*Naturwissenschaften*, **45**, 3, p. 62, 1958.

During the 6 years that have elapsed since its recognition in central Germany, the M3 strain of potato virus Y, which is responsible for vein necrosis of tobacco [**36**, p. 503], has developed into a major cause of economically significant crop reductions, especially of cigarette vars. Although potatoes, the principal reservoir of infection, generally suffer less severely than tobacco, U. Hamann has informed the authors that M3 may cause substantial losses in that crop too.

During an epiphytotic of the virosis in 1956 ordinarily resistant varieties were attacked, suggesting the implication of a new strain. This hypothesis was confirmed by the positive results of experiments on the resistant V20 and other varieties resistant to M3 with 1 of 3 isolates from plants at the Tabakforschungsinstitut, Dresden. All 3 were associated with a strain of cucumber mosaic virus, from which the one used for the tests, herein designated 'Wi', was separated. All the inoculated plants developed typical necroses. On Samsun tobacco the symptoms were similar

to those induced by M3 but milder. Unlike M3, Wi caused neither local nor systemic symptoms in *Petunia hybrida*.

The exact identity of the new strain of potato virus Y is still uncertain. The symptoms resulting from inoculation with the Brazilian 'necrotic fleck' strain [**34**, p. 265] were different, and it was further unable to attack V20.

ENDEMANN (W.) & BERGER (P.). **Die Anfälligkeit der Nicotiana-Arten und tabacum-Sorten gegenüber dem Rippenbräune-Virus im Freiland.** [The susceptibility of *Nicotiana* species and *tabacum* varieties to the vein-browning virus in the field.]—*Ber. Inst. Tabakforsch. Dresden*, **4**, 2, pp. 247–264, 3 fig., 1 diag., 1957. [Russian and English summaries.]

A tabulated survey is presented of the experiments during 1954–56 at the Institut für Tabakforschung, Dresden, Germany, comprising a large number of *Nicotiana* species and commercial tobacco vars. The vein-browning strain of potato virus Y [see above] was responsible for heavy damage in each of the years except 1955. *N. tabacum* was the only one of about 20 spp. to react to inoculation with clear-cut symptoms of the virus, all the Macrophylla and Virginia and most of the oriental types being susceptible. *N. glutinosa* responded in the manner described by Klinkowski and Schmelzer [**36**, p. 503], while the reaction of *N. sylvestris* was ambiguous. None of the 15 types of *N. rustica* contracted infection.

Two distinct types of resistance occur, viz., the immunity already demonstrated in V 20 and a limited type of tolerance in which the virus is latent throughout the plant.

BIRD (J.). **A whitefly-transmitted mosaic of Jatropha gossypifolia.**—*Tech. Pap. P.R. agric. Exp. Sta.* 22, 35 pp., 10 fig., 1957. [Spanish summary.]

A study of a mosaic disease of *Jatropha gossypifolia* observed by the author in Jamaica in 1951 and apparently identical with a mosaic of the same host in Puerto Rico [cf. **10**, p. 810] showed that the causal agent was transmissible by grafting, and by the whitefly *Bemisia tabaci* after a min. acquisition feeding period of 2 hr. and a min. inoculation feeding period of 10 min., but not mechanically, by seed, or by dodder (*Cuscuta*). Seedling (but not mature) tobacco plants were infected in the greenhouse by viruliferous whiteflies from *J. gossypifolia* and developed symptoms closely resembling those of tobacco leaf curl virus [map 147]; similar symptoms were also found on tobacco in the greenhouse and then, for the first time in Puerto Rico, on field tobacco. Attempts, however, to recover the causal agent from these tobacco plants by the use of whiteflies were negative.

STEPHEN (R. C.). **The influence of nitrogen, phosphorus, and potassium nutrition of flue-cured Tobacco on the incidence of Cercospora leafspot disease.**—*Emp. J. exp. Agric.*, **27**, 101, pp. 64–69, 1958.

In work for the Tobacco Research Board of Rhodesia and Nyasaland the author noted that when the barn-spot phase of *C. nicotianae* [**37**, p. 312] was checked by using high yellowing temperatures and humidities during curing disease incidence was inversely related to N level, whereas when barn-spot development was allowed to proceed unchecked the relationship was direct. The same tendency existed when the N was applied in several instead of 1 application, but to a much lesser extent. The levels of P and K had no effect on the amount of disease.

MARCELLI (E.). **L'avvizzimento batterico (Ps. solanacearum) del Tabacco in Italia.** [Bacterial wilt (*Ps[eudomonas] solanacearum*) of Tobacco in Italy.]—*Ric. fitop. Campan.*, **13–14**, pp. 53–68, 2 pl., 1957. [51 refs. English summary.]

After reporting the occurrence of *Pseudomonas solanacearum* on tobacco in various parts of Italy [cf. **30**, p. 249], the author gives an account of the disease in semi-popular terms, based largely on the literature.

Voskanyan (S. S.). Устойчивость межвидовых гибридов Томата к септории и макроспориозу. [The resistance of interspecific Tomato hybrids to septoriosis and macrosporiosis.]—*Изв. Акад. Наук. Арм. С.С.Р.* [*Bull. Acad. Sci. Arm. SSR.*], **10**, 11, pp. 119–124, 1957. [Armenian summary.]

From the Plant Breeding Institute, Leningrad, further work is reported [**37**, p. 250] on crossbreeding tomato with *L*[*ycopersicon*] *hirsutum* and *L. peruvianum*, the former giving progeny more resistant to *Macrosporium* [*Alternaria*] *solani* and *Septoria lycopersici* [loc. cit.], especially in crossing with Shtambov Karlik.

Day (P. R.) & Sherratt (H. S. A.). **Anthraquinones in radiation-induced mutants of Cladosporium fulvum.**—*Biochem. J.*, **68**, 2, pp. 11P–12P, 1958.

In further studies at the John Innes Horticultural Institution, Bayfordbury, Herts, yellow pigments were extracted in a relatively pure state from X-ray-induced red mutants of *C. fulvum* [**36**, p. 621] and from the purple wild type in culture on oatmeal slopes by washing the cultures with ethanol. From their solubilities, colour reactions, and spectra the pigments appear to be hydroxylated anthraquinones.

Moore (Agnes E.). **Bibliography of forest disease research in the Department of Agriculture.**—*Misc. Publ. U.S. Dep. Agric.* 725, 186 pp., 1957.

This bibliography of 2,285 titles consists mainly of papers by workers in the Division of Forest Pathology, U.S. Dept Agric., covering research from 1899 to Jan. 1954. There is a combined author and subject index.

Grigorova (Roza). Ракови заболявания на Акацията в Русенски окръг. [Canker diseases of Acacia in the Ruschuk region.]—*Горско стопанство* [*J. Bulg. For. Soc.*], **12**, 8, pp. 352–361, 1956. [Abs. from *Referat. Zh. Biol.*, *1957*, 23, p. 139, 1957.]

In 1955, in Bulgaria, *Diaporthe fasciculata*, *Pseudovalsa profusa*, and an unknown fungus were isolated from acacia trees. Those of 15 years or older were very severely attacked. The disease is especially prevalent in damp places. Destruction of plantations with 30–40% diseased trees is recommended.

Vlasov (A. A.) & Karangauz (R. A.). Грибные болезни, способствующие ослаблению и усыханию Ясеня и Тополя в степных насаждениях. [Fungal diseases responsible for the weakening and wilting of Ash and Poplar trees in steppe plantations.]—*Сб. работ. по лесн. х-ву Всес. н.-и. ин-т лесоводства механиз. лесн. х-ва.* [*Sborn. nauch.-issled. Inst. lesn.*] 33, pp. 91–111, 1956. [Abs. from *Referat. Zh. Biol.*, *1957*, 23, p. 139, 1957.]

This is a detailed survey of diseases attacking ash and poplar in the steppes of U.S.S.R. The morphology of the causal agents is described. Those on ash are: scab (*Endoxylina astroidea*), necrosis (*Hysterographium fraxini*), *Cytophoma pulchella*, and white necrosis (*Phoma* sp. and *Cytospora* sp.). On poplar black necrosis (*C. foetida* sp. nov.), yellow necrosis (*C. szembelii*), and brown necrosis (*C. chrysosperma*) are recorded. There is a comparison of the diseases in forest and steppe regions.

Callahan (K. L.). **Prunus host range and pollen transmission of Elm mosaic virus.**—*Diss. Abstr.*, **17**, 9, p. 1861, 1957.

In view of the possible association of elm mosaic virus [**30**, p. 293] with one or more of the stone fruit viruses 28 *Prunus* vars. (representing 18 spp.) were inoculated, at the University of Wisconsin, by budding with infected elm. Symptoms developed in 15 (13 spp.), the commonest being chlorosis and twisting of the leaf lamina, while

necrosis, chlorotic lines and rings, and vein clearing were also observed. Virus was recovered in tobacco from 16 of the 28 test vars., 4 of which were symptomless carriers, and in elm from 13.

Although the symptoms on certain of the *Prunus* spp. recalled those of some stone fruit viruses, the difference in host range, coupled with the failure of attempts to transmit local *Prunus* viruses to elm, led to the conclusion that elm mosaic virus differs from the viruses reported to exist naturally in *Prunus*.

Since the virus was found in pollen from an infected tree [cf. **37**, p. 91] tests were carried out with cut branches forced under glass to investigate all possible pollination combinations between healthy and infected parents. The resultant seedlings were examined for infection by inoculation to tobacco, the findings establishing that infection may be transmitted from pollen to seed. Transmission to the healthy flower and hence to the healthy tree was, however, not observed. The virus in pollen was active after 3 years' storage at 0° C.

Urošević (B.) & Jančařík (V.). **Některé závažné choroby Dubových semenáčků ve školkách.** [Some important diseases of Oak saplings in our nurseries.]—*Práce výzk. Ust. lesn. Č.S.R.* [*Stud. For. Res. Inst. CSR.*], **13**, pp. 95–123, 31 fig., 1957. [Russian and French summaries.]

This is a detailed account of parasitic and saprophytic fungi noted in the last few years on oak saplings in Czechoslovakia. A new disease caused by *Ophiostoma valachicum* is described. In the course of artificial inoculations 2 phases were observed: very young seedlings show leaf rot symptoms similar to those found on cotyledons developing from outwardly healthy acorns; older plants show the symptoms of wilt found in more mature saplings in the forest. Another important disease is caused by *Rosellinia quercina* [cf. **35**, p. 800], which is particularly destructive to saplings in nurseries. *Pestalozzia* [*Pestalotia*] disease, caused by *P. truncata*, and a type of mildew caused by a complex in which *Erysiphe* sp. predominates are found also in nurseries, and reference is made to 15 other fungi.

Marinković (P.) & Marinković (B.). **Uticaj drvne truleži na kvalitet jedne izdanačke šume hrasta Lužnjaka u Sremu.** [The influence of wood rot on the quality of Oak forest in Srem.]—*Sumarstvo*, **10**, 3–4, pp. 168–178, 1957. [English and French summaries.]

At Ogar, Lower Srem, Yugoslavia, a forest stand of oak 110 years old on a poorly drained site was clear-felled and 100 trees were cut up and graded for wood quality. The economic loss from decay was estimated at nearly 30%. The chief wood-rotting fungi were *Polyporus sulphureus* and *P. dryophilus* [**35**, p. 335].

Urosević (B.). **Mykoflora skladovaných Žaludů.** [Mycoflora of stored Acorns.]—*Praće výsk. Ust. lesn. ČSR.* [*Stud. For. Res. Inst. C.S.R.*], **13**, pp. 149–200, 32 fig., 2 graphs, 1957. [Russian and French summaries. 38 refs.]

In a detailed study on stored acorns it has been proved that amongst other causes of loss fungi are responsible for considerable damage, especially *Sclerotinia pseudotuberosa* [cf. **28**, p. 547], which mummifies them. This is the most serious menace to stored acorns, causing up to 23% loss and making them unpalatable for animals. The following fungi, which reduce the quality of the acorns, are also listed: *Sclerotinia libertiana* [*S. sclerotiorum*], *Ophiostoma* sp., *Gloeosporium quercinum*, *Phomopsis quercella* [**36**, p. 435], *Cytospora intermediata*, *Schizophyllum commune*, and *Botrytis cinerea*.

Schönhar (S.). **Ein Beitrag zur Frage der Anfälligkeit verschiedener Pappelarten und Pappelsorten gegen Dothichiza populea.** [A contribution to the question of the susceptibility of different Poplar species and varieties to *Dothichiza*

populea.]—*Mitt. Ver. forstl. Standortskunde ForstpflZücht.* 6, pp. 59–62, 1957. [Abs. in *For. Abstr.*, **19**, 1, p. 80, 1957.]

In further field inoculation trials in Württemberg [cf. **33**, p. 694], *Populus nigra* var. *italica* and *P. simonii* were the least resistant to *D. populea*, followed by *P. alba* × *P. tremula*, but even in the most resistant hybrid, *P.* × *regenerata*, about half the inoculated plants developed conspicuous damage. Though infection rates varied during the years and with the times of inoculation, ranking remained fairly constant. Injuries were much more severe in the second growing season after inoculation than at any other time. Inoculation during the dormant period was effective. In plot experiments, infection rates were equal for *P.* × *regenerata* and *P. trichocarpa* in moist or very moist conditions, but under dry conditions more *P. trichocarpa* became infected and had more severe injuries.

Živojinović (D.). **Sušenje Topola na Deliblatskoj Peščari.** [Poplar mortality on the Deliblatska Peščara.]—*Šumarstvo*, **9**, 11–12, pp. 721–724, 1956. [Abs. in *For. Abstr.*, **19**, 1, p. 80, 1957.]

In 1956 many trees died in 3- to 5-year-old poplar plantations in Yugoslavia as a result of attack by *Dothichiza populea* [cf. **30**, p. 507], *P*[*opulus*] × *robusta*, *P.* × *serotina*, and *P. nigra* var. *italica* being most severely affected; the most resistant were *P. alba*, *P. nigra*, and 'Bachofeni'. The trees had been damaged by frost 3 months before.

Barbas (P.). **Répartition et extension du Phaeolus fibrillosus (Karst.) B. et G. dans le nord des Vosges.** [The distribution and spread of *Phaeolus fibrillosus* (Karst.) B. & G. in the northern Vosges.]—*Rev. Mycol., Paris*, **22**, 3, pp. 291–292, 1 diag., 1957.

In July 1953, the author found a few specimens of *P. fibrillosus*, not previously recorded in France, in 6 localities in the Vosges Mountains, in all cases on pectinate fir [*Abies pectinata*], generally on felled trunks, once on a stump. The fungus, which is tending to spread westward, lives on dead wood, often in association with *Ungulina marginata* [*Fomes marginatus*: cf. **36**, p. 223, *et passim*].

Fukarek (P.). **Neke starije i novije rasprave o Pančićevoj Omorici.** [Some old and new discussions on the Pančiće Omorika.]—*Šumarstvo*, **10**, 3–4, pp. 245–257, 3 fig., 1957. [Received Feb. 1958.]

In the plant disease and pest section (pp. 253–257) of this study on Serbian spruce (*Picea omorika*) in the Viogor mountain area of Bosnia, Yugoslavia, the author records that *Lophodermium macrosporum* attacked the needles. From wounds on the trunk *Trametes* [*Fomes*] *pini* was isolated. As junipers have been infected by these fungi it is suspected that they are transmitted by insects which are common to both trees. *Herpotrichia nigra* was found to attack trees up to 5 years old.

Truman (R.) & Cartwright (J. B.). **The use of seed dusts to reduce losses due to pre-emergence damping-off in Pinus radiata.**—*Tech. Notes N.S.W. For. Comm. Div. Wood Tech.*, **10**, 3–4, pp. 1–2, 1956. [Received 1958.]

Dusting seed of *P. radiata* with hexcebunt, ziram, and thiram, each at 4 oz./50 lb. seed, resulted in increases in emergence of 128, 106, and 112% over untreated controls.

Barber (J. C.), Dorman (K. W.), & Bauer (E.). **Slash Pine progeny tests indicate genetic variation in resistance to rust.**—*Res. Note Stheast. For. Exp. Sta.* 104, 2 pp., 1957. [Abs. in *For. Abstr.*, **19**, 1, p. 79, 1957.]

In slash pine [*Pinus elliottii*] planted in 1952–3 there was significantly less infection

by *Cronartium fusiforme* [cf. **35**, p. 797 and below] in 1955 in the progeny of certain open-pollinated mother trees selected for resistance than in 4 lots of control seedlings. The offspring of one tree had an infection rate 50% lower.

Goggans (J. F.). **Reducing losses from southern fusiform rust.**—*Leafl. Ala. agric. Exp. Sta.* 54, 4 pp., 1957. [Abs. in *For. Abstr.*, **19**, 1, p. 79, 1957.]

There was no important difference in the amount of infection by *Cronartium fusiforme* in 5–16-year-old plantations of slash and loblolly pine [*Pinus elliottii* and *P. taeda*] that had never been cut, but longleaf pine [*P. palustris*] had much less than either. The year of planting markedly affected the amount of infection; a good or a bad year was the same for all species. The percentage of infected trees decreased as the number of trees/acre increased. The amount of infection rose as the rate of height growth increased. Plantings on good sites grew more rapidly and had more rust than those on poor sites.

Fischer (W.). **Zur Föhrenschütte Lophodermium Pinastri.** [On the Pine-cast *Lophodermium pinastri*.]—*Schweiz. Z. Forstw.*, **108**, 4/5, pp. 260–270, 1957. [French summary.]

This is a study of the life-cycle of *L. pinastri* [**35**, p. 247] and the damage it causes to Scots pine [*Pinus sylvestris*], both seedlings and mature trees. Plantations entirely of pines in closely set rows are the most vulnerable. In mixed plantations with deciduous trees danger of infection is greatly reduced because the fallen apothecia are covered by leaves and the spores are less likely to infect healthy needles. The author recommends spacing seedling pines at 140×70 cm. or 120×80 cm., with intermediate rows of deciduous trees, equidistant at 60 or 70 cm. This would give 100 pines and 100 deciduous trees/100 sq. m.

Tamblyn (N.) & Da Costa (E. W. B.). **A simple technique for producing fruit bodies of wood-destroying basidiomycetes.**—*Nature, Lond.*, **181**, 4608, pp. 578–579, 2 fig., 1958.

A method for the production of identifiable fruit bodies from a wide range of basidiomycete cultures has been devised at the Division of Forest Products, Melbourne, Australia. The culture is established on an enriched sawdust medium in a glass jar covered by an inverted, wider jar. When vigorous mycelium has developed throughout the medium, the cover-jar is replaced by a sterile wooden block (*Pinus radiata* sapwood or balsa) $2\frac{1}{4} \times 2\frac{1}{4} \times 1\frac{3}{4}$ in., with a well $\frac{3}{4}$ in. deep in the lower face to fit over the mouth of the jar, and another well $\frac{1}{4}$ in. deep in the upper face. The block is covered with a sterile sheet of polyethylene film held round the neck of the jar by a rubber band.

The culture jars are then incubated at lab. temp. in diffuse daylight in a shallow tank containing water to maintain high humidity. When the fungus reaches the surface of the block, the polyethylene film is removed and the block is kept moist by adding water periodically to the well in the top face. Fruit bodies are generally produced by 30–40% of the cultures, the time taken (after the jars have been placed in the tanks) ranging from 2–3 weeks for *Schizophyllum commune* to 6 months or more for *Fomes gilvus*.

Holzschutzmittel—Verzeichnis. [List of wood preservatives.]—13th ed., 20 pp., Hamburg, Technische Zentralstelle der deutschen Forstwirtschaft, 1957. [Abs. in *For. Abstr.*, **19**, 1, p. 123, 1957.]

Alphabetical and classified lists of preservatives for application to timber before and after installation, fire-proofing agents, and priming coats having an anti-blue-stain effect are given.

Bavendamm (W.). **Überblick über die Holzschutzpatente der Bundesrepublik Deutschland im ersten Halbjahr 1957.** [Summary of the wood preservation patents issued in the German Federal Republic in the first half year, 1957.]—*Holzzentralbl.*, **83**, 93, p. 1143, 1957. [Abs. in *For. Abstr.*, **19**, 1, p. 123, 1957.]

Of the 7 patents mentioned, one is for a plastic substance containing preservatives, which hardens at room temperature, for filling hollows in wooden structures. Another is for the impregnation of living trees in such a manner that the preservative, introduced through the horizontal cuts, moves up in the sap-stream and interrupts the descending sap. A third is for the preservation of wood by heating and steaming in an insulated container, which induces formation of phenol-type substances in the timber.

Cartwright (J.). **Fence post preservation by the sap displacement method.**—*Tech. Notes N.S.W. For. Comm. Div. Wood Tech.*, **10**, 3–4, pp. 3–4, 2 fig., 1956. [Received 1958.]

From the Division of Wood Technology the author reports that small newly-cut and decorticated posts of almost any timber sp. can be satisfactorily preserved by the sap displacement method [cf. **35**, p. 567; **36**, p. 563] using copperized chromated zinc chloride, which is well 'fixed' once it has been sucked into the butt. The cost of preservative per small post is about 1/0*d*.–1/3*d*.

Thornton (J.). **Cooling tower packings: A vacuum/pressure treatment specification.**—*Timber Technology*, **65**, 2216, pp. 297–299, 1 fig., 2 graphs, 1957.

This is an account of the investigations which led to the establishment of a commercial specification for the treatment of cooling tower timbers against the [unspecified] moulds causing soft rot [**36**, p. 800]. *Pinus sylvestris* timber is treated by the full cell process with tanalith C. Six months' experience of the commercial application of the method on a wide scale has shown that the treatment is commercially practicable and satisfactory.

Hughes (R. L.). **Microbiology in the paper and board making industry.**—*Proc. tech. Sect. Brit. Paper Mkrs Ass.*, **38**, 2, pp. 179–198, 33 fig., 1957.

In the first of this series of papers, presented at the 73rd General Conference, Mar. 1957 [see below], the author defined the field of microbiology and discussed its relevance to the paper- and board-making industry.

Heron (P. N.) & Sproule (J. St. G.). **The chemical nature of fungicidal agents employed in the pulp and paper industry.**—*Proc. tech. Sect. Brit. Paper Mkrs Ass.*, **38**, 2, pp. 199–220, 1957.

The authors bring together facts on the physical and chemical properties of biocidal agents in common commercial use in the pulp and paper industry [cf. **35**, p. 801], with special consideration of 3 main groups: pentachlorphenol and its Na and Cu salts, the organo mercurials, and 8-hydroxyquinoline and its Cu derivatives. It was noted that in many instances combinations of fungicides give much better results than individual fungicides, and the economic aspects of treatments were stressed.

Russell (P.). **Problems concerning the infection of groundwood pulp.**—*Proc. tech. Sect. Brit. Paper Mkrs Ass.*, **38**, 2, pp. 241–254, 1957.

Penicillium roquefortii [cf. **35**, p. 409] displays extraordinary resistance to organically combined mercury and is able totally to inactivate mercurial preparations used for pulp preservation. Other species of *P.*, including *P. cyclopium*, occasionally

grow on mercury-treated groundwood, as does *Phoma lignicola*, which is not merely mercury-resistant but can attack the pulp, causing large, coloured stains, which are, however, less conspicuous than those produced by basidiomycetes.

Visual examination can be very misleading, as pulp apparently in bad condition owing to infection by blueing fungi, green moulds, *Fusarium* species causing pink stains, and cellulolytic bacteria may cause no operating troubles in the newsprint mill, but patches of genuine decay caused by basidiomycetes may pass unnoticed as some of these fungi cause rotting without obvious staining.

The few well-defined stains readily identifiable visually [cf. **34**, p. 560] are: (1) extensive yellow with patches of green spores, *Trichoderma* sp.; (2) a pale purplish, spreading stain, *Penicillium roquefortii*; (3) large grey to grey-green, scattered stains, often due to *Stemphylium* spp. and *Alternaria* spp.; (4) large, scattered, purplish stains, darker than (2) but easily confused with them, associated with attack by *Phoma lignicola*; and (5) small, grey to blue-grey spots, usually scattered over the lap and caused by the blueing fungi *Cladosporium* spp., *Pullularia pullulans*, *Margarinomyces fasciculatus*, or *Trichosporium heteromorphum*.

Air-sampling experiments [cf. **35**, p. 698] in Norway showed that the stock, pulp sheet, and exposed laps in the baling presses were continually being infected by airborne basidiomycete spores. A study of the effect of grinding temp. on subsequent deterioration showed that 79·5° C. was sufficient to sterilize the stock, but grinding temp. alone provides inadequate control as there is re-infection.

Investigation of the occasional failure of phenyl mercuric acetate showed that partial detoxification of organo-mercurials occurs by reaction with the pulp itself [cf. **32**, p. 141].

Experiments also showed that bacteria can detoxify phenyl mercuric acetate as rapidly *in vitro* as does *P. roquefortii*. It was ascertained experimentally that whereas the mercury-susceptible *Bacillus subtilis* and *Aspergillus niger* were prevented from growing at the toxic concentration of phenyl mercuric acetate used, the mercury-tolerant *P. roquefortii*, bacterium *A 3*, and bacterium *B 2* grew vigorously. Moreover, in the plates seeded with the resistant organisms, the active mercury content fell to nil after 48 hr. at 25°. Other experiments demonstrated that the amount of phenyl mercuric acetate normally present in wet lapped groundwood pulp (33·6 p.p.m.) can be completely inactivated by the bacteria *A 3* and *B 2 in vitro* in 2 days at 25°, an effect not produced by the mercury-susceptible *B. subtilis* and *A. niger*.

Browning (B. H.). **Practical aspects of the effects of micro-organisms on groundwood pulp.**—*Proc. tech. Sect. Brit. Paper Mkrs Ass.*, **38**, 2, pp. 255–272, 1 fig., 4 graphs, 1957.

Investigations of preservative treatment and storage of groundwood pulp were described and the use of pulp infected by red rot (also known as 'rot' or 'brown rot') [cause unspecified: cf. **28**, p. 606] discussed. Study of methods of assisting the disintegration of such pulp showed that the addition of wetting agents had no effect, but the use of alkaline additives gave some success.

Evans (Dorothy M.). **The use of fungicides in paper, board, and packing materials.**—*Proc. tech. Sect. Brit. Paper Mkrs Ass.*, **38**, 2, pp. 279–291, 1 graph, 1957.

The author noted the fungi commonly found on packaging materials and described physical and chemical methods of protection, with reference also to the possibility of killing fungal and bacterial spores by ionising radiations. Many kinds of packed goods can be sterilized by means of radioactive isotypes, such as caesium 137, or waste products from the new atomic power stations, or electrical devices, such as the linear accelerator.

Bremer (H.). **Chemische Saatgutbehandlung bei Gemüse.** [Chemical seed treatment of vegetables.]—*Gartenbauwiss.*, **22 (4)**, 3, pp. 364–396, 3 fig., 1957. [English summary. 85 refs.]

The author gives a detailed and fully tabulated account of a series of trials at the Institut für Gemüsebau und Unkrautforschung, Neuss, Lauvenburg, Germany, from which the following general conclusions may be drawn. The object of chemical treatment of vegetable seed is the protection of the young seedling rather than disinfection of seed. Purely organic preparations are proving superior to those containing heavy metals. Those with captan, COBH (quinonoxime-benzoylhydrazone) [**36**, p. 200], and thiram were promising. Excess treatment in general did no harm, and in the case of spinach and onion seed improved the stand.

With spinach, emergence was improved by orthocide 50 and COBH (as cerenox), which were superior to atiram and organic mercurials: seed treated with the organic preparations could be stored for 9½ months. With cabbage seed success was not certain. Pure organic preparations were superior to organic mercurials. The emergence of pea seed was usually improved by treatment. There was a certain sensitivity but orthocide 50 and 83, cerenox, and atiram were tolerated and gave substantial improvement of emergence of seed of low germinating capacity. Bean (*Phaseolus vulgaris*) anthracnose (*Colletotrichum lindemuthianum*) was to a large extent controlled by cerenox together with Hg (cerenox special). Emergence of beans was usually improved by orthocide, cerenox, and atiram, preferably in combination with pesticides. Seed thus treated was stored for 6 months without injury.

Chemical treatment of carrot seed usually improves emergence. Orthocide, cerenox, and atiram gave good results and the seed could be stored for 7½ months. With celery the treatments had no effect, and germination was reduced by excess dosage. Treatment of cucumber seed is nearly always profitable. Atiram and orthocide were superior to a mercurial under normal conditions, but with very slow germination the reverse was the case. With tomato seed cerenox, orthocide, and atiram gave improved stands only where germination was slow. With lettuce all three were superior to a mercurial, and treated seed was unimpaired by storage for 8½ months. A chloronitrobenzene preparation decreased emergence of leek and onion; arasan and polyram decreased it in the former only, and orthocide in neither. The different crops differed widely as to the amount of fungicide which adhered to the seed, tomato seed taking up 50 times more powder/weight than bean seed.

Darpoux (H.), Louvet (J.), & Ponchet (J.). **Essais de traitement des semences de crucifères contre le Phoma lingam (Tode) Desm. et l'Alternaria brassicae (Berk.) Sacc.** [Experiments on the seed treatment of Crucifers against *Phoma lingam* (Tode) Desm. and *Alternaria brassicae* (Berk.) Sacc.]—*Ann. Épiphyt.*, **8**, 4, pp. 545–557, 4 fig., 1957.

At the Station Centrale de Pathologie Végétale, Versailles, colza seed artificially inoculated (*a*) with *Phoma lingam* [cf. **35**, p. 418] and (*b*) with *Alternaria brassicae* [**33**, pp. 70, 707], and radish seed naturally infected by the latter fungus were treated in the laboratory and (in the case of the former) in the greenhouse with various fungicidal dusts. The best results were given by certain organo-mercury products, used at 300 g./quintal. Two, however, ethyl mercury phosphate and methyl mercury dicyanodiamide, though very active, were phytotoxic at dosages of over 200 g./q., and even at this level to seed stored for some months. Thiram, captan, quinone compounds, and quinoline derivatives gave satisfactory disinfection at 300 g./q. Copper salts were ineffective.

Kupryanova (Mme V. K.). Особенности биологии **Peronospora brassicae Gäumann.** [Peculiarities of the biology of *Peronospora brassicae* Gäumann.]—*Trav. Soc. Nat., Moscow-Leningrad*, **42**, 5, pp. 760–763, 2 fig., 1957.

At the Pushkin Agricultural Institute, Leningrad, it was shown that *Peronospora brassicae* [*P. parasitica*: **35**, p. 255] develops on cabbage not only in the field but also in storage, when it produces a dry mildew on the heads. Oospores form mainly in the stem. The fungus overwinters as oospores and mycelium in the seed capsule and in the style. The diseased leaves left in the field do not play a very important role in overwintering.

Vukovits (G.). **Über ein stärkeres Auftreten der Adernschwärze bei Kohl.** [On a heavy outbreak of black rot in Cabbage.]—*Pflanzenarzt*, **11**, 3, pp. 41–42, 2 fig., 1958.

A popular account of black rot (*Xanthomonas campestris*) of cabbage in Austria [map 136].

Bel'tyukova (Mme K. G.) & Kulikovskaya (Mme M. D.). Результати польового випробування ефективності передпосівної обробки насіння Капусти препаратум 'бактерол А'. [Results of field tests of the efficiency of the pre-sowing treatment of Cabbage seeds with the compound 'bacterol A'.]—Мікробіологичний журн. [*J. Microbiol., Kiev*], **18**, 3, pp. 45–47, 1956. [Russian summary. Abs. from *Referat. Zh. Biol., 1957*, 19, p. 176, 1957.]

In field trials in the Kiev district seed treatment of the cabbage vars. Amager 611*b*, Slava 1305, and Brunswick in 0·1% bacterol A for 30 min. increased germination by 28–55% (according to the var.), checked infection by *Xanthomonas campestris* [**36**, p. 801; **37**, p. 192], and improved the yield by 12–25%.

Bondoux (P.). **Sur une maladie du Cresson, nouvelle en France.** [On a disease of Watercress new in France.]—*C.R. Acad. Sci., Paris*, **246**, 9, pp. 1457–1458, 1958.

Attention is drawn to the recent discovery in watercress beds in Seine-et-Oise and Meurthe-et-Moselle of the 'crook root' disease (*Spongospora* sp.) previously reported from England [**37**, p. 1]. Infection is already spreading rapidly and assuming alarming proportions.

Kristensen (H. R.). **Gulmosaik hos Kålroer i Danmark.** [Yellow mosaic of Swedes in Denmark.]—Reprinted from *Ugeskr. Landm., 1957*, 49–50, 10 pp., 7 fig., 1 map, 1957. [English summary.]

Turnip yellow mosaic virus, first observed on swedes in Denmark in 1957, may well have been present in 1910, and in any case the virus was probably widespread on turnips from 1921–30; it then disappeared simultaneously with the discontinuance of cultivation of the crop for fodder. A recent survey revealed infection in 324 out of 528 fields of swedes.

Inoculation experiments were successful only on turnip, swede, mustard, radish, and Chinese cabbage.

In serological tests heat-clarified sap from infected swedes gave a precipitation titre of 1:128, the corresponding level for a semi-purified virus solution being 1:65,526. The dilution end point of the virus in infective Chinese cabbage sap was over $1:10^6$ and the thermal inactivation point above 75° C. Kept at room temperature, infective plant sap retained its virulence for 2 but not for 3 weeks.

Information is also presented on the occurrence of the disease in other countries, with special reference to England [**28**, p. 261 *et passim*].

Bachthaler (G.). **Die wichtigsten Krankheiten und Schädlinge im türkischen Zuckerrübenanbau.** [The most important diseases and pests of Sugar Beet in Turkey.]—*Pflanzenschutz*, **10**, 2, pp. 21–24, 4 fig., 1958.

These observations have already been noticed [**37**, p. 256].

Esau (Katherine). **Curly top symptoms in an inoculated cotyledon of the Sugar Beet.**—*Hilgardia*, **27**, 1, pp. 1–14, 7 fig., 1 diag., 1957.

At Riverside, California, beet curly top virus [cf. **37**, p. 194] was inoculated by means of *Circulifer tennelus* [*Eutettix tenella*] into the upper half of one cotyledon of a highly susceptible strain (no. 2769). Phloem hyperplasia, characteristic of the disease [**13**, p. 145; cf. **22**, p. 329], was observable in the main vein and some others on the 3rd day after inoculation, often accompanied in the former by marked necrotic obliteration in the older phloem tissue, a hitherto undescribed symptom. Hyperplasia in the inoculated cotyledon and the first 2 foliage leaves, and the external symptoms in the latter were all noted concurrently. Non-inoculated cotyledons on the same plant showed no curly top symptoms after 12 days.

Goryushin (V. A.) & Kokhan (M. A.). Желтуха Сахарной Свеклю. [Sugar Beet yellows.]—Сахар. Пром. [*Sug. Ind., Moscow*], **38**, 3, pp. 51–52, 1 fig., 1957. [Received 1958.]

Sugar beet yellows virus [map 261] was recorded for the first time in the Kiev region, USSR, in 1956. Since then it has been reported in W. Ukraine and the Lvov region. The virus has been transmitted by the black beet aphid [*Aphis fabae*] and the peach aphid [*Myzus persicae*]. In the Ukraine the disease attacked 60–70% of the plants, decreasing root yields by 18%, leaves by 10%, and sugar content by 0·5%.

Wagner (F.). **Untersuchungen über Blattlaus- und Vergilbungsauftreten bei Zuckerrüben in den Jahren 1956 and 1957 in Unterfranken.** [Studies on the occurrence of aphids and yellows in Sugar Beet in 1956 and 1957 in Lower Franconia.]—*Pflanzenschutz*, **10**, 1, pp. 7–10, 3 graphs, 2 maps, 1958.

In this study reported from the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Außenstelle Würzburg, the degree of *Myzus persicae* infestation on beets in 1956 and 1957, ascertained by trapping and by examination of the crops, was found to be related to the severity of beet yellows virus symptoms.

Schultz (G.). **Diagnostische Unterscheidungsmöglichkeiten der virösen Gelbsucht und des Magnesiummangels bei Zuckerrüben.** [Possibilities of diagnostic differentiation of virus yellows and magnesium deficiency in Sugar Beets.]—*Zucker*, **11**, 4, pp. 87–91, 5 fig. (3 col.), 1958.

From the Forschungsinstitut der Kleinwanzlebener Saatzucht AG, Einbeck, Germany, the author explains and tabulates the diagnostic differentiation of beet yellows virus and magnesium deficiency [**33**, p. 698; cf. **36**, p. 743] on the basis of chemical analyses and symptoms. In magnesium deficiency reduction of the element is considerably heavier in the outer than in the inner leaves (from 0·8–1 in healthy material to 0·3 mg./kg. fresh weight), and the former are therefore used for analytical purposes.

Canova (A.). **Richerche sull'influenza della poltiglia bordalese nel metabolismo complessivo di piante di bietola zuccherina.** [Researches on the influence of Bordeaux mixture on the general metabolism of Sugar-Beet plants.]—*Ann. Sper. agr.*, N.S., **11**, 5, pp. 1155–1176, 1957. [English summary. 49 refs.]

At the Istituto di Patologia vegetale, Università di Bologna, Italy, Mezzano N.P. sugar beets were sprayed in 1953–4 against *Cercospora beticola* [cf. **35**, p. 259, *et passim*] as follows: (1) 1% Bordeaux mixture; (2) 0·4% zineb (65% active material); (3) 1% Bordeaux, during the first vegetative period only; (4) as (3), then 0·4% zineb; (5) untreated. In 1955 the treatments were: (1) 1% Bordeaux; (2) 0·3% zineb (87% active material); (3) 1% Bordeaux during the first vegetative period, followed

by 0·3% zineb; (4) 0·6% Bordeaux, followed by 0·3% zineb; (5) 0·3% Bordeaux, followed by 0·3% zineb; (6) no treatment. In the first 2 years the yields from the plants treated continuously with Bordeaux were very small compared with those of the plants treated first with Bordeaux and then with zineb. These differences were confirmed in 1955, and it is concluded that 1% Bordeaux probably depressed plant growth.

Stahl (Marianne). **Beitrag zur Klärung der Ursachen rätselhafter Krankheitsbilder bei Rüben.** [A contribution to the clarification of the causes of some puzzling disease symptoms in Beet.]—*NachrBl. dtsch. PflSchDienst (Braunschweig), Stuttgart*, **10**, 3, pp. 33–35, 6 fig., 1958.

From the Landesanstalt für Pflanzenschutz, Stuttgart, the author reports the development of girth scab-like symptoms [cf. **36**, p. 743] in sugar beet following a broadcast application of $Ca(NO_3)_2$ in mid June. The chief symptom was a more or less severe constriction, often accompanied at its deepest point by a dark patch resembling insect injury. A section through this patch revealed brown staining of the tissues to some depth, and in the later stages an [unspecified] rot developed, finally cutting off the upper parts. This condition clearly resulted from broadcasting the fertilizer as no symptoms occurred in its absence or where it had been applied carefully around each plant without contact; in mild cases where no constriction occurred there were pits at the surface in which traces of the fertilizer were present.

Also, in a healthy stand of sugar beet, a round patch of plants exhibited mild wilting and retarded growth in mid July. An extensive brown-stained schizogenous hollowing was characteristic, the cavity connecting with the exterior through one or more scabby pits which were the only external sign. Affected plants could seldom be pulled whole. No parasite was present and the cause was not determined.

Amberger (A.) & Frömel (W.). **Zur Wirkung des Bors verschiedener borhaltiger Einzel- und Volldünger zu Zuckerrüben.** [On the effect of boron in different boron-containing, single and complete fertilizers for Sugar Beets.]—*Z. Pfl-Ernähr. Düng.*, **79** (**124**), 3, pp. 193–203, 1957.

A tabulated survey is presented of the results of recent experiments at the Agrikulturchemische Versuchsstation der Technischen Hochschule, Munich, Germany, to determine the comparative effects on sugar beets in 2 alkaline soils of soil amendments of bor-nitrophoska, bor-kampka, and bor-lime ammonia and of the corresponding boron-free combinations+a borax supplement. The influence of boron was reflected in increased yields and the absence of heart and dry rot [boron deficiency: **34**, p. 575].

Kachatryan (M. S.). Болезни Шпината в пригородной зоне г. Еревана. [Diseases of Spinach in the suburban district of Erevan.]—Изв. Акад. Наук. Арм. С.С.Р. [*Bull. Acad. Sci. Arm. S.S.R.*], **9**, 12. pp. 111–115, 1956. [Armenian translation. Received Dec. 1957.]

Three diseases of spinach are recorded for the first time in the Armenian S.S.R. *Peronospora effusa* was exceptionally prevalent in early spring during wet weather. Soil disinfection, crop rotation with at least 2 years between successive spinach crops, and spraying with Bordeaux mixture reduced the disease to a trace where incidence had previously reached 45%. An unidentified root rot was controlled by adequate drainage and systematic roguing. Infection was associated with several fungi; *Pythium debaryanum* was isolated frequently but is probably only a secondary invader. Cucumber mosaic virus causing leaf curl affects more than 50% of the plants. This infection was shown to be seed-borne.

Muntañola (Maria). **Parasitos criptogámicos de Arvejas (Pisum spp.) y Poroto (Phaseolus spp.) en la provincia de Tucumán.** [Cryptogamic parasites of Peas (*Pisum* spp.) and Beans (*Phaseolus* spp.) in the province of Tucumán.]—*Rev. agron. Noroeste Argent.*, **1**, 3, pp. 283–299, 11 fig., 1955. [English summary. Received Dec. 1957.]

This paper from the Laboratorio de Fitopatalogía, Tucumán, Argentina, reports the results of observations on the following, attacking peas and beans: *Peronospora pisi* [*P. viciae*], *Sclerotinia sclerotiorum*, *Erysiphe polygoni*, *Ascochyta pisi*, *Cercospora lathyrina* [**21**, p. 180], and *Cladosporium cladosporioides* on peas, and *Pseudomonas* [*medicaginis* f.] *phaseolicola*, *Xanthomonas phaseoli*, *E. polygoni*, *Uromyces phaseoli typica* [*U. appendiculatus*], *Colletotrichum lindemuthianum*, *Cercospora canescens*, and *Alternaria* sp. on beans.

Sörgel (G.). **Die Problematik der bisherigen Vorstellungen über die Resistenz gegen pilzliche Krankheitserreger, erläutert am Beispiel der Fuß- und Fleckenkrankheit der Erbsen.** [The problem of previous ideas on resistance to fungal pathogens, explained by the example of foot and spot diseases of Peas.]—*S.B. dtsch. Akad. Landwiss.*, **5**, 16, pp. 3–20, 7 fig., 7 graphs, 1956. [23 refs.]

After a general discussion of the complementary roles of host and pathogen in the development of plant diseases the author describes experiments at the Institut fur Pflanzenzüchtung, Quedlinburg, Germany, demonstrating that varietal differences in the resistance of peas to foot rot (*Mycosphaerella pinodes*) and to pod and leaf spot (*M. pinodes*, *Ascochyta pisi*, and *A. pinodella* [cf. **36**, p. 444]) are correlated with the presence in the tissues of substances which inhibit pycnidial formation by the pathogens. Thus when *M. pinodes* was cultured on filter papers placed on media containing seed coat extracts from various pea varieties a change from vegetative growth to pycnidial production could be obtained by transfer from media containing extracts of varieties resistant to foot rot to media containing extracts from susceptible varieties, and *vice versa*. The inhibitory substance was most probably an anthocyanin (cf. *Naturwissenschaften*, **39**, pp. 452–453, 1952). Pycnidial formation on cotyledon decoctions in similar experiments was taken as a measure of resistance to pod and leaf spot infection. Findings with a number of varieties indicated that there was only a 33% correlation between resistance to foot rot and resistance to pod and leaf spot. Marrowfat peas were the most resistant. Further experiments suggested that there was a substance in the cotyledon decoctions from resistant varieties which inhibited the uptake of sugar.

Wallen (V. R.). **The identification and distribution of physological races of Ascochyta pisi Lib. in Canada.**—*Canad. J. Pl. Sci.*, **37**, 4, pp. 337–341, 1957.

Using 7 pea varieties as differential hosts at the Canada Dept Agric., Ottawa, the pathogenicity of 80 isolates of *A. pisi* from 6 provinces of Canada [cf. **35**, p. 63] was tested. Races 1 and 2 have been distinguished from the Prairie Provinces, 3 from the Georgian Bay area and central Ontario, and 4 from the Ottawa valley, and to some extent in central and western Ontario, Quebec, and Nova Scotia.

Barrie (A. G.). **Cowpeas resistant to wilt.**—*Cane Gr. quart. Bull.*, **21**, 2, pp. 39–41, 1 fig., 1957.

Trials with cowpeas for resistance to wilt caused by *Phytophthora* sp. in Queensland [**35**, p. 877] showed Black Eye No. 5 and C.P.I. nos. 12153 and 9259 G. to be completely resistant, a wide range of resistance appearing in different varieties. Planting time is important, particularly with the moderately resistant group, because early planted cowpeas showed 56·6% survival, the later ones 39·5%.

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CONTENTS

AUTHORS' NAMES

Agarwal, 388
Agarwala, 408
Alimova, 389
Amberger, 431
Amici, 401
Anand, 396
Azakawa, 418
Bachthaler, 429
Baldwin, 406
Bancroft, 416
Barbas, 424
Barber, 424
Barrett, 389
Barrie, 432
Bauer, 424
Baumann, 413
Bavendamm, 426
Beltrá, 392
Bel'tyukova, 429
Bercks, 385
Berger, 419, 421
Bertini, 401
Bird, 421
Blattný, 401
Böing, 396
Bondoux, 429
Boone, 411
Boullard, 396
Bourke, 417
Braun, 417
Bremer, 428
Browning, 427
Burghardt, 385
Caldwell, 404
Callahan, 422
Cameron, 407
Canova, 386, 430
Carpena, 408
Cartwright (J.), 426
Cartwright (J.B.), 424
Chamberlain, 387
Chanturya, 414
Chapman, 406
Chararas, 393
Chenery, 419
Chien, 409
Christov, 415
Christova, 410
Chu (M.-L.), 408
Chu (Y.), 405
Compton, 404
Coryushin, 430
Cox, 387
Cristinzio, 393
Croxall, 395
Da Costa, 425
Dadant, 408
Darpoux, 428
Day, 422
Dixon, 406
Domes, 414
Dorman, 424
Dunleavy, 387
Durrieu, 399
Eckstein, 394
Ehlers, 413
Emiliani, 389
Endemann, 421
Erwin, 407
Esau, 430
Evans, 427
Fischer, 425
Frey, 406
Frömel, 431
Fukarek, 424
Gaskin, 404
Gerhold, 401
Goggans, 425
Goheen, 388
Golovin, 400
Grassi, 397
Grigorova, 422
Grosclaude, 414
Guillén, 408
Guyot, 403
Hagler, 390
Haller-Kiessig, 416
Hardison, 405
Harmon, 388
Haunold, 406
Hausam, 396
Hawn, 416
Hebert, 407
Hemingway, 406
Henderson, 392
Heron, 426
Hetnarski, 394
Hirai, 419
Howland (Ryland), 406
Hsu, 409
Hughes, 426
Hull, 385
Hussein, 410
Iizuka, 415
Ivancheva-Gabrovska, 420
Jackson, 398
Jameson, 406
Jančařík, 423
Johar, 396
Joly, 401
Jones, 416
Jordana, 392
Jung, 410
Kachatryan, 431
Kaesberg, 416
Kakulya, 414
Karangauz, 422
Kaufmann, 387
Keitt, 411
Kelman, 407
Kendrick, 398
Kharitinova, 401
Kiessig, 416
Kiewnick, 402, 419
Klesser, 388
Kline, 411
Klinkowski, 420
Kochetkova, 398
Kokhan, 430
Koshimizu, 415
Kotte, 411
Kovachevski, 414
Králiková, 411
Krexner, 394
Kristensen, 429
Kulikovskaya, 429
Kupryanova, 428
Le Roux, 388
Limasset, 401
Lin (K.-H.), 408
Lin (K.-R.), 407
Liu, 407
Louvet, 428
Lucas, 419
Luke, 406
Madaluni, 390
Makarov, 390
Marcelli, 395, 421
Marinković (B.), 423
Marinković (P.), 423
Marx, 386
Massenot, 403
Mayor, 399
Meiners, 405
Merny 391
Messiaen, 407
Middelburg, 399
Moore, 422
Mundry, 386
Muntañola, 387, 432
Murphy, 406
Naim, 410
Neururer, 405, 406
Nicolson, 396
Niemann, 404
Nishikawa, 419
Nysterakis, 397
Ochs, 338
Pai, 400
Parmentier, 405
Pelletier, 385
Person, 387
Petersen, 401
Picci, 395
Picco, 394
Pine, 390
Ponchet, 428
Protsenko, 415
Purdy, 404
Raykov, 390
Reich, 412
Riceman, 416
Rier, 392
Riggs, 387
Roland, 420
Rudenko, 391
Russell, 426
Sánchez, 408
Schafer, 404
Schaffnit, 391
Schmelzer, 402, 420
Schmidt, 410
Schönbeck, 398
Schönhar, 423
Schultz, 430
Schuster, 402
Semal, 403
Sherratt, 422
Shimomura, 419
Simard, 385
Simons, 405, 406
Sims, 397
Singh, 406
Smith, 392
Sörgel, 432
Speroni, 393
Sproule, 426
Stahl, 431
Stephen, 421
Steudel, 385
Stoll (C.), 410
Stoll (K.), 412
Storey, 406
Taber, 395
Tamblyn, 425
Tandon, 388, 408
Teakle, 415
Thornton, 426
Thorpe, 406
To, 405
Todorova, 410
Tollenaar, 403
Touzé, 397
Treggi, 411
Truman, 424
Tupenevich, 391
Turner, 417
Umemura, 418
Uota, 390
Urbański, 394
Uritani, 418
Urošević, 423
Van Steveninck, 417
Verona, 395, 399
Vining, 395
Vlasov, 422
Volkov, 391
Voskanyan, 422
Vukovits, 411, 429
Wagner, 430
Wallace, 406
Wallen, 432
Wang, 405
Weber, 393
Weinberger, 388
Weinhold, 401
Wenzl, 394
Winstead, 387
Zanardi, 394, 407, 412, 413, 414
Zimin, 391
Živojinović. 424

SUBJECT INDEX

Actinomycetes, 401
Antagonism, 397–398
Antibiotics, 387, 395
Bacteria, 392
Books, 391, 411
Diseases and disorders of:
  Cacao, 403
  Cereals, 391, 403–408
  Citrus, 408
  Coffee, 408
  Cotton, 408–410
  Flowers and ornamentals, 410–411, 417
  Fruit, 411–415
  Groundnut, 388
Herbage crops, 415–417
Insects, 393
Paper pulp, 426–427
Potato, 388, 417–418
Spices, 396
Sugar beet, 385–386, 429–431
Sugar-cane, 418
Tea, 419
Textiles, 395
Tobacco, 393, 402, 419–421
Tomato, 422
Trees and timber, 398, 422–426
Vegetables, 385, 387, 389, 428–429, 431–432
  Vine, 388–391
Fungicides, 387, 393–395, 413
General publications, 395, 422
Lists of fungi or diseases, 399–400
Mycorrhiza and symbiosis, 396
Physiology, 392, 397, 422
Reports from French Equatorial Africa, 408; French West Africa, 391
Soils and fertilizers, 398–399
Systematic mycology, 400–401
Technique, 401, 425
Virus diseases, 385–386, 387, 401–403, 415–417, 419–422, 425, 427, 428.
Yeasts, 399

ERRATA

Vol. 37, p. 285, ll. 22, 25; p. 331, l. 47; p. 332, ll. 32, 34, 35, 40, 41; p. 355, ll. 42, 44, 47, for 'flax' read 'cotton'.

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